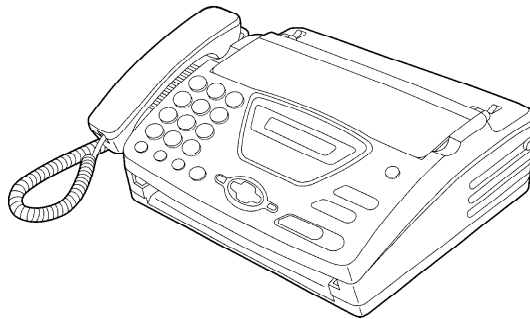


ORDER NO. KMF0206587C3

Service Manual

Personal FAX
KX-FT72SA-W
White Version
(for South Africa)



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WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.

1. INTRODUCTION

1.1. SAFETY PRECAUTIONS

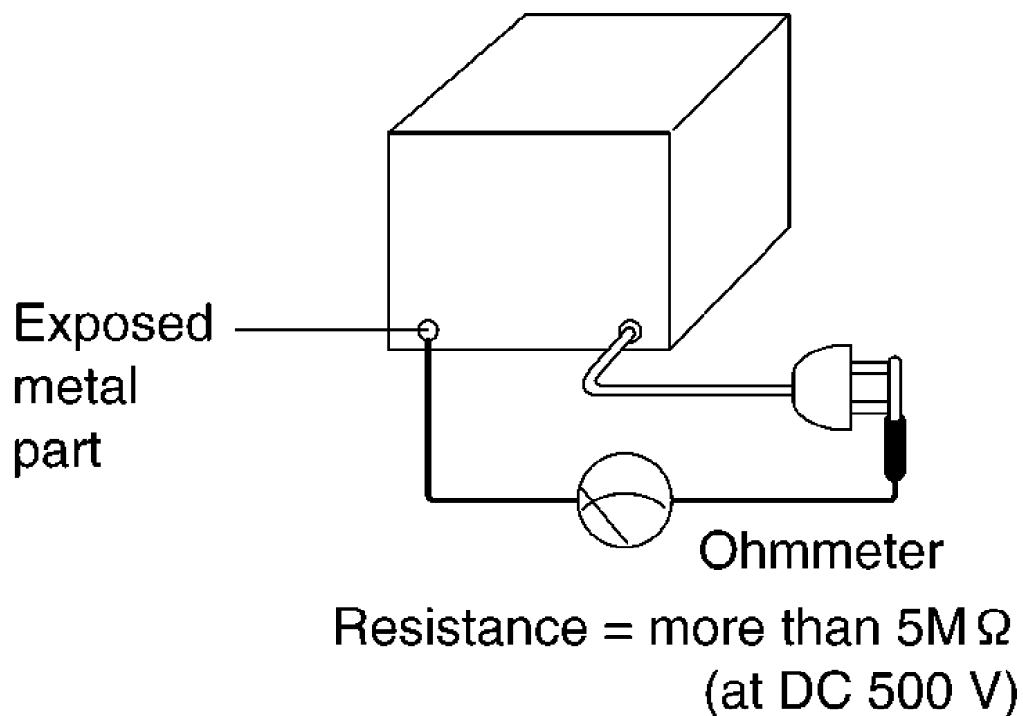
1. Before servicing, unplug the AC power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components.
3. Check the condition of the power cord. Replace if wear or damage is evident.

4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.2. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).
Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. / The equipment should be repaired and rechecked before it is returned to the customer.



1.3. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity. / When repairing, the following precautions will

help prevent recurring malfunctions.

1. Cover the plastic part's boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch the IC or LSI pins with bare fingers.

1.4. BATTERY CAUTION

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

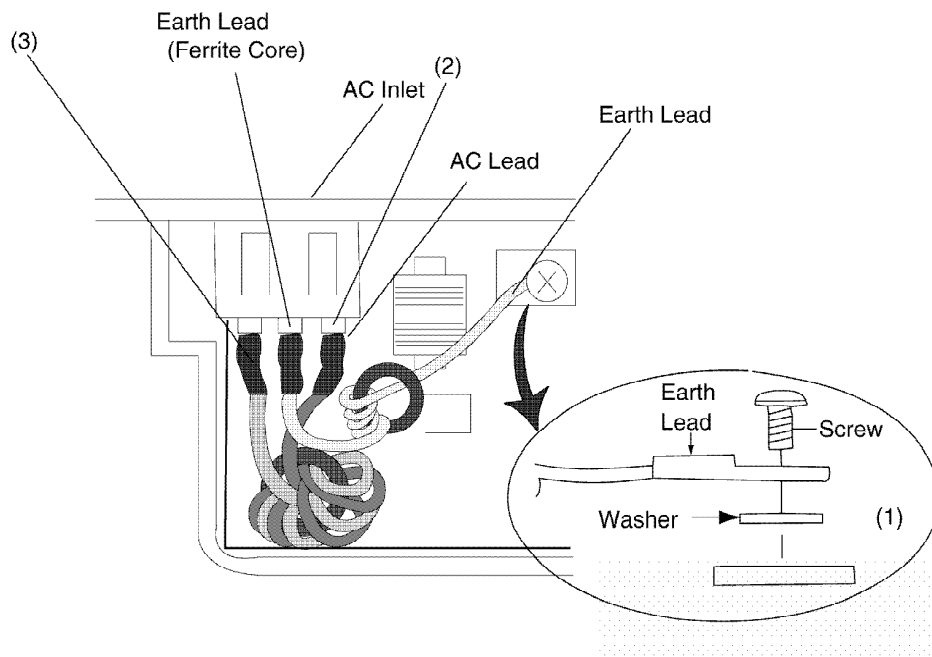
Dispose of used batteries according to the manufacture's Instructions.

The lithium battery is a critical component . (type No. CR2032). Please observe for the proper polarity and the exact location when replacing it and soldering the replacement lithium battery in.

1.5. AC CAUTION

For safety, before closing the lower cabinet, please make sure of the following precautions.

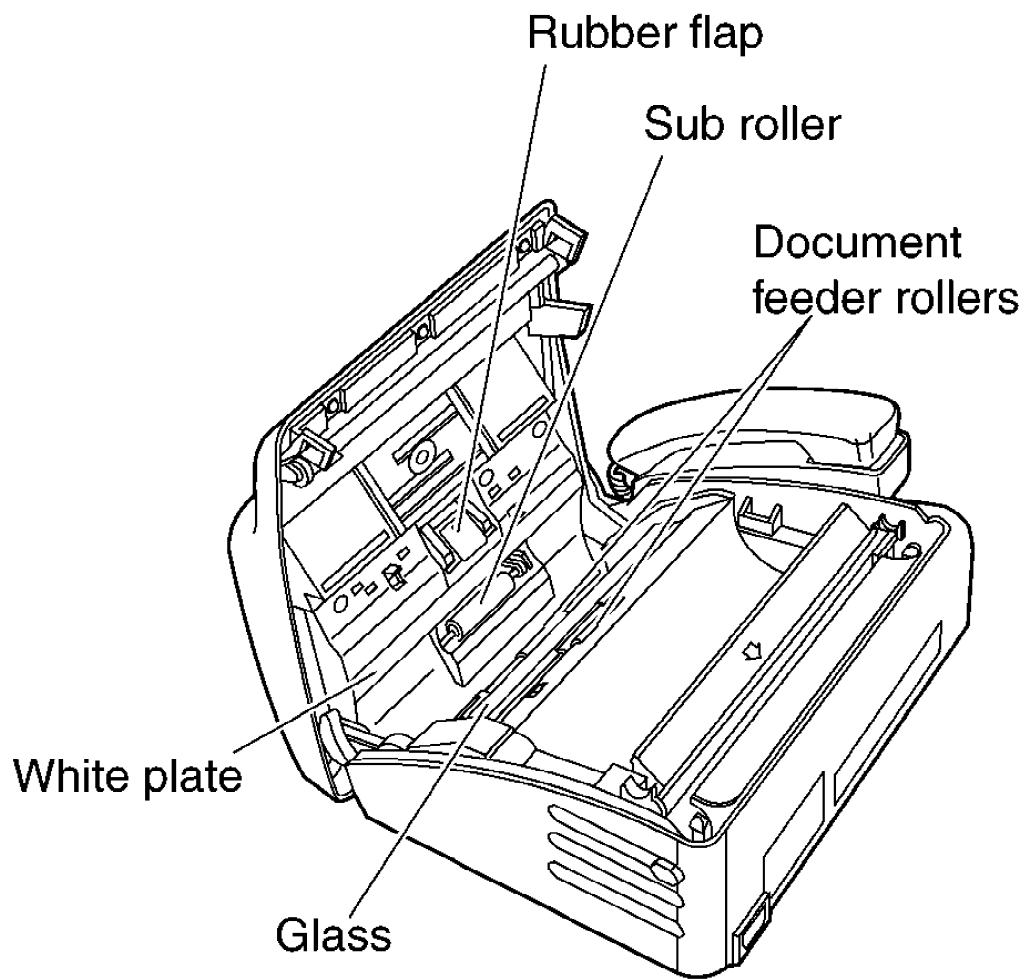
- (1) The earth lead is fixed with the screw.**
- (2) The AC connector is connected properly.**
- (3) Wrap the Earth Lead lead around the core 4 times.**



1.6. PERSONAL SAFETY PRECAUTIONS

1.6.1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit. / The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.



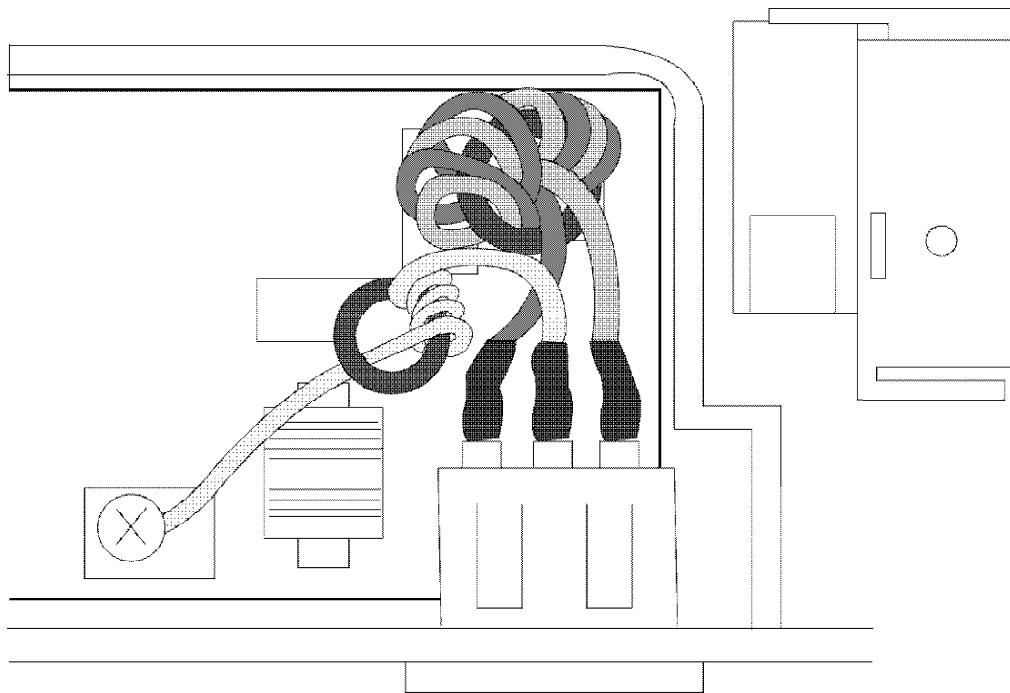
1.6.2. LIVE ELECTRICAL SECTIONS

All the electrical sections of the unit supplied with AC power by the AC power cord are live. / Never disassemble the unit for service with the AC power supply plugged in.



AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.

Be careful of "High Voltage" in this area.



(Bottom view)

1.7. FEATURES

General

- Help function

Please refer to **WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION.**() to print below features.

- DIRECTORY
- RECEIVE MODE

Facsimile

- Space Saving Compact Design
- Resolution: Standard, Fine/Photo, Super Fine
- Copier Function
- Automatic Document Feeder (10 Sheets)
- Help Printout
- Easy-to-view LCD (15 Characters)

Integrated Telephone System

- Electric Volume Control
- On-hook dialing
- Redialing function
- Temporary tone dialing
- Electric Telephone directory

1.8. SPECIFICATIONS

Applicable Lines:

Public Switched Telephone Network

Document Size:

Max. 216 mm (8 1/2") in width

Max. 600 mm (23 5/8") in length

Effective Scanning Width:

208mm (8 3/16")

Recording Paper Size:

216 mm max. 30 m (8 1/2"×98") roll

Effective Printing Width:

208 mm (8 3/16")

Transmission Time*:

Approx. 15 s/page (Original mode)**

Approx. 30 s/page (G3 Normal mode)

Scanning Density:

Horizontal:

8 pels/mm (203 pels/inch)

Vertical:

3.85 lines/mm (98 lines/inch)—STANDARD

7.7 lines/mm (196 lines/inch)—FINE/PHOTO

15.4 lines/mm (392 lines/inch)—SUPER FINE

Halftone Level:

64-level

Scanner Type:

Contact Image Sensor (CIS)

Printer Type:

Thermal Printing

Data Compression System:

Modified Huffman (MH), Modified READ (MR)

Modem Speed:

9,600 / 7,200 / 4,800 / 2,400 bps; Automatic Fallback

Operating Environment:

5°C—35°C (41°F—95°F), 45 %—85 % RH (Relative Humidity)

Dimensions (H×W×D):

118 mm × 338 mm × 246 mm (4 5/8" × 13 5/16" × 9 11/16")

Mass (Weight):

Approx. 2.5 kg (5.5 lb.)

Power Consumption:

Standby: Approx. 3.8 W

Transmission: Approx. 20 W (When sending the ITU-T No.1 Test Chart)

Reception: Approx. 33 W (When receiving the ITU-T No. 1 Test Chart)

Copy: Approx. 30 W (When copying the ITU-T No. 1 Test Chart)

Maximum: Approx. 110 W (When copying a 100 % black document)

Power Supply:

220-240 V AC, 50/60 Hz

* Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of the other party's machine.

** Transmission speed is based upon the ITU-T No. 1 Test Chart and original mode. (Refer to **TEST CHART** (.))

If the capability of the other party's machine is inferior to your unit, the transmission time may be longer.

Note:

- Any details given in these instructions are subject to change without notice.
- The pictures and illustrations in these instructions may vary slightly from the actual product.

1.9. OPTIONAL ACCESSORY

Model No.	Description	Specifications
KX-A106	Standard thermal recording paper	216 mm × 30 m (8 1/2"×98') roll, with 25 mm (1") core

1.10. TEST CHART

1.10.1. ITU-T NO.1 TEST CHART



THE SLEREXE COMPANY LIMITED

SAPORS LANE - BOOLE - DORSET - BH 25 8 ER

TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC

18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

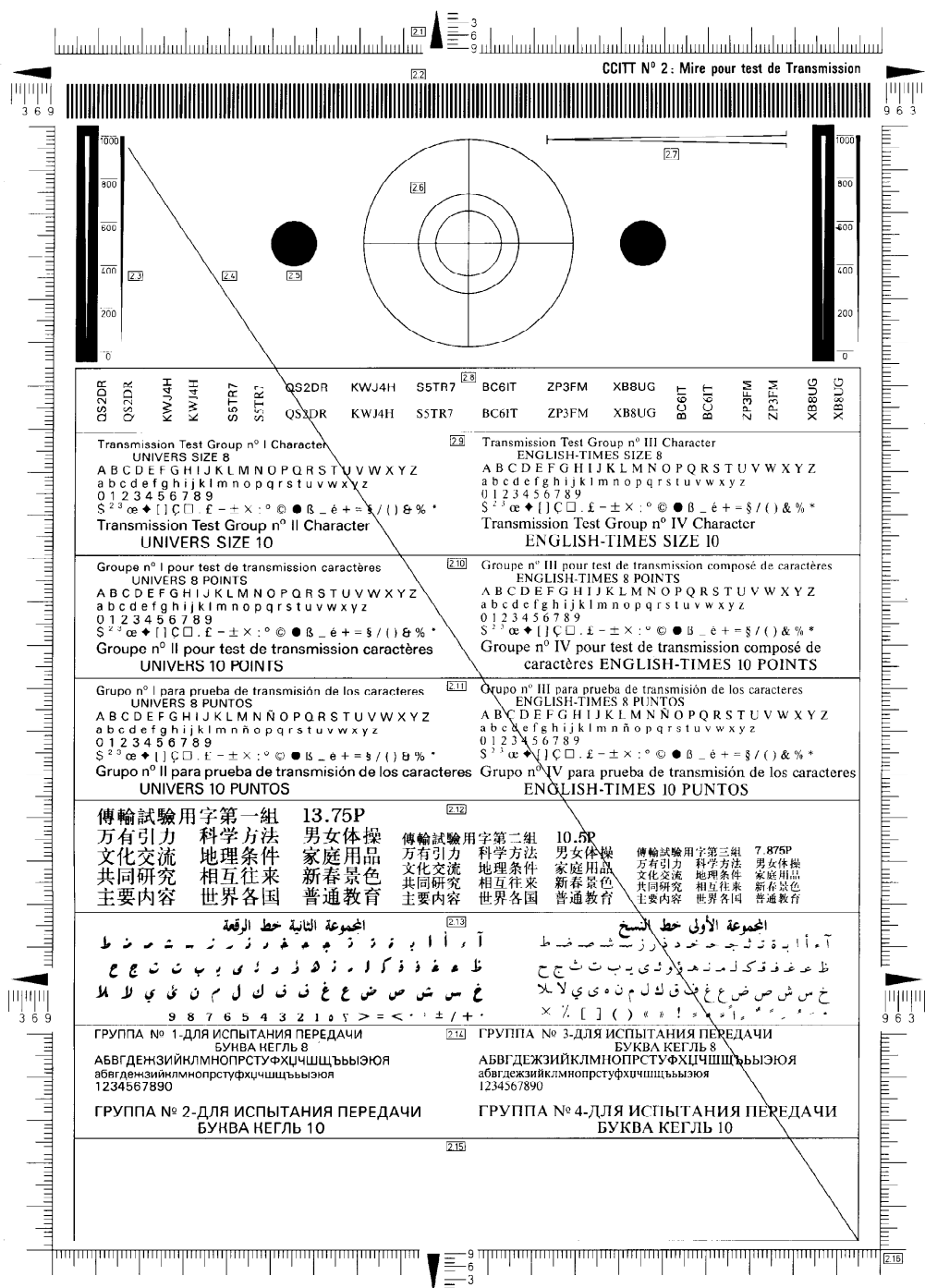
At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

Yours sincerely,

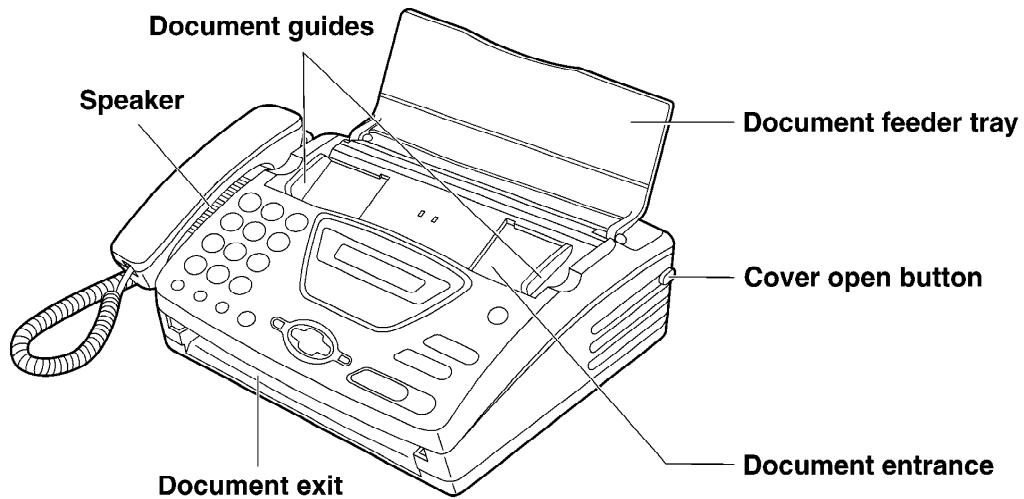
P.J. CROSS
Group Leader - Facsimile Research

1.10.2. CCITT NO. 2 TEST CHART

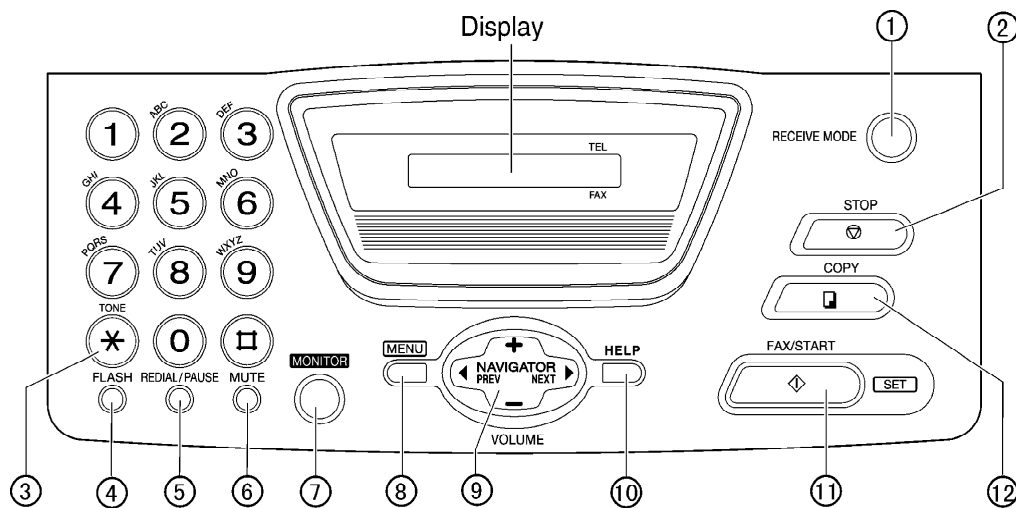


1.11. LOCATION OF CONTROLS

1.11.1. OVERVIEW



1.11.2. CONTROL PANEL



① RECEIVE MODE

- To change the receive mode.

② STOP

- To stop an operation or cancel programming.

③ TONE

- To change from pulse to tone temporarily during dialing when your line has rotary pulse services.

④ FLASH

- To access special telephone services such as call waiting or for transferring extension calls.

⑤ REDIAL/PAUSE

- To redial the last number dialed. If the line is busy when you make a phone call using the **MONITOR** button, the unit will automatically redial the number up to 5 times.
- To insert a pause during dialing.

⑥ MUTE

- To mute your voice to the other party during a conversation. Press this button again to resume the conversation.

⑦ MONITOR

- To dial without lifting the handset.

⑧ MENU

- To initiate or exit programming .

⑨ NAVIGATOR, VOLUME

- To adjust volume.
- To search for a stored name.
- To select the features or feature settings during programming.

- To navigate to the next operation.

10 HELP

- To print a quick reference.

11 FAX/START, SET

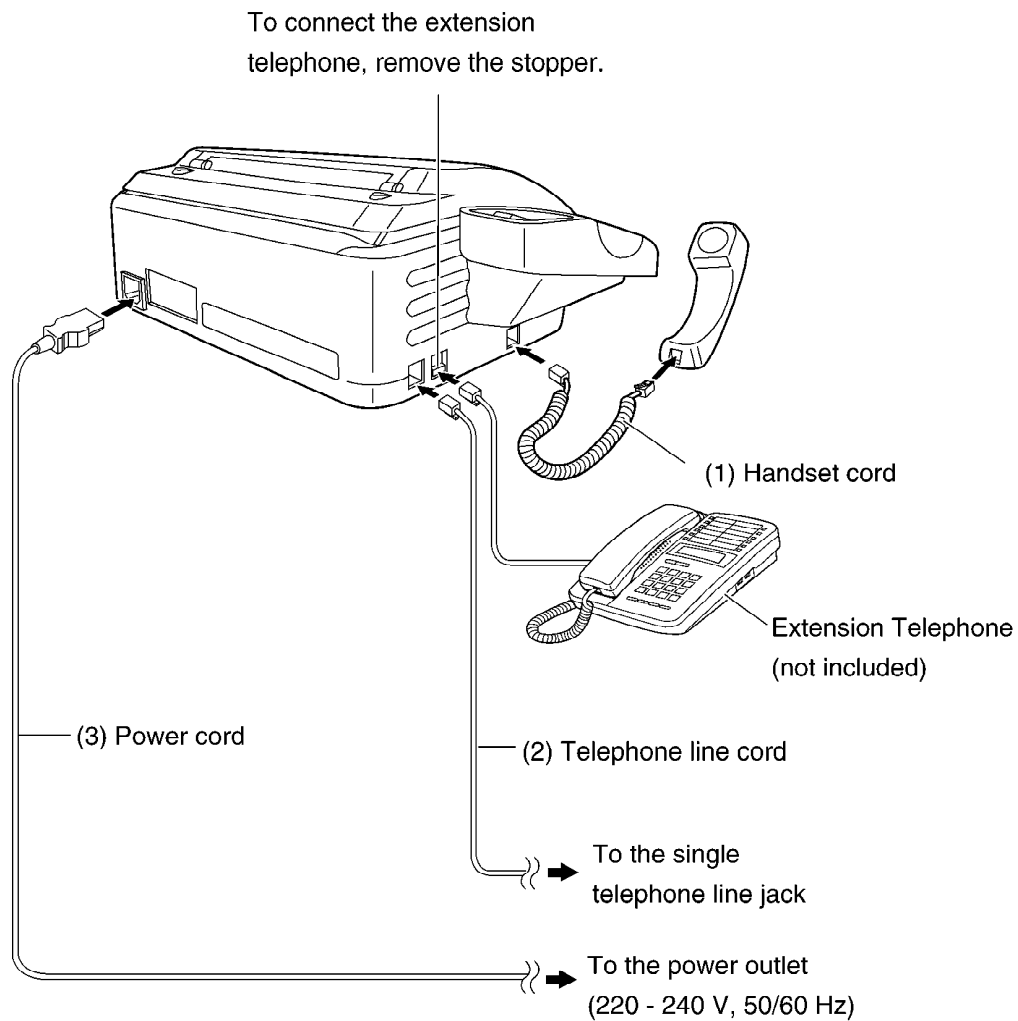
- To initiate fax transmission or reception.
- To store a setting during programming.

12 COPY

- To initiate copying.

1.12. CONNECTIONS

- (1) Connect the handset cord.
- (2) Connect the telephone line cord.
- (3) Connect the power cord.



Note:

When you operate this products, the power outlet should be near the product and easily accessible.

To use the fax machine with a computer on the same line

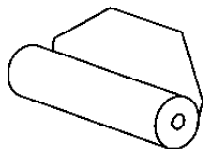
- We recommend you use separate wall jacks for the fax machine and the computer.
- Set the fax machine to TEL mode.
- The device which has the shortest ring setting will answer the call first.
- If the computer provides a port for telephone line, connect the fax machine to this port on the computer.

1.13. INSTALLATION

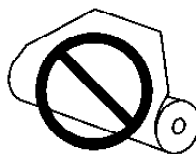
1.13.1. INSTALLING THE RECORDING PAPER

1. Open the cover by pressing the cover open button and install the recording paper roll.

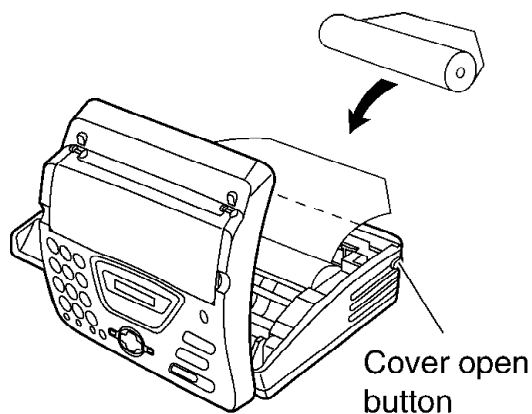
Correct



Incorrect

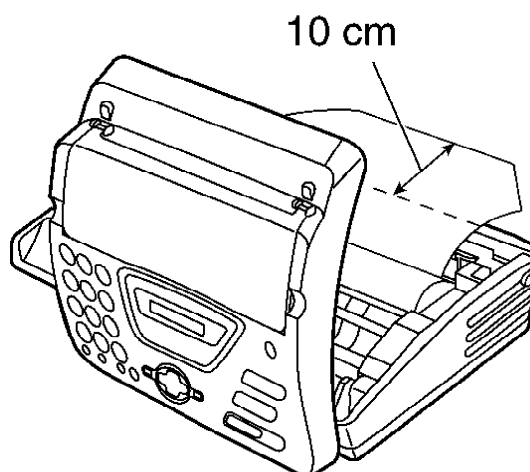


- If the paper is secured with glue or tape, cut approximately 15 cm (6 inches) from the beginning of the roll.

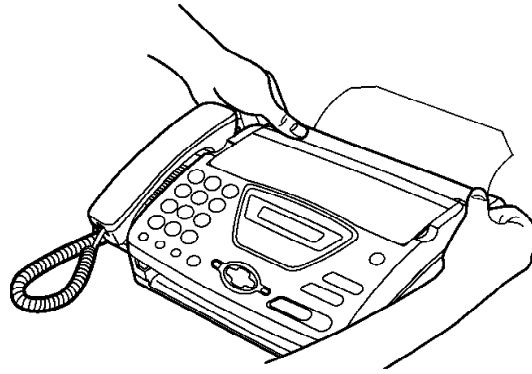


2. Pull the leading edge of the paper approximately 10 cm (4 inches) out of the unit.

- Make sure that there is no slack in the paper roll.



3. Close the cover securely by pushing down on both sides.



4. Tear off the excess paper by pulling it towards you.



Note:

- Only use the included roll of paper or specified recording paper, or else the print quality may be affected and/or excessive thermal head wear may occur.
- To order recording paper, see **OPTIONAL ACCESSORY** ().
- When the power cord is connected, every time you close the cover a message will be printed if the recording paper is set to the wrong side, a message will not be printed. Install the paper correctly.

1.13.2. SETTING YOUR LOGO

The logo can be your company, division or name.

1. Press **MENU** .

SYSTEM SET UP

2. Press **[SET]** .

PRESS [◀ ▶] & [SET]

3. Press **◀** or **▶** until the following is displayed.

YOUR LOGO

4. Press **[SET]**

LOGO=

5. Enter your logo, up to 30 characters, by using the dial keypad.

Example: Bill

A. Press **[2]** 2 times.

LOGO=B

Cursor

B. Press **[4]** 6 times.

LOGO=Bi

C. Press **[5]** 6 times.

LOGO=Bi

D. Press **▶** to move the cursor to the next space and press **[5]** 6 times.

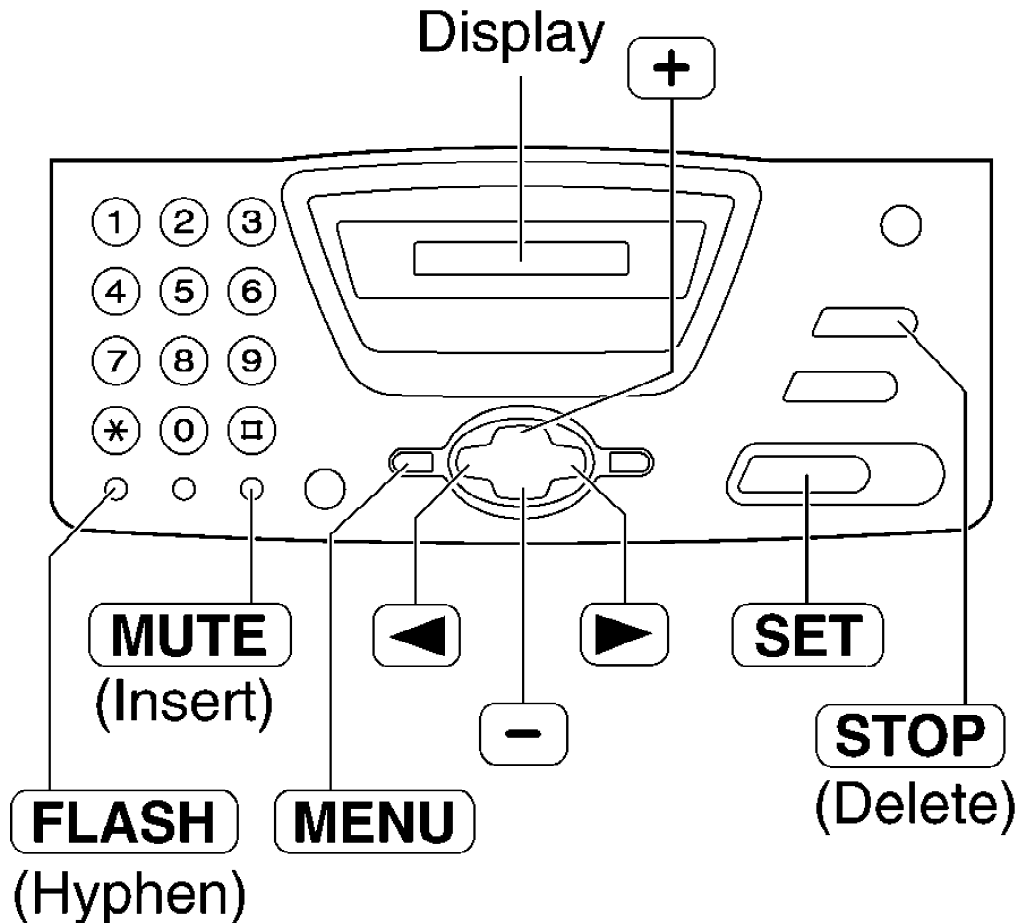
LOGO=Bill

6. Press **[SET]**.

- The next feature will be displayed.

YOUR FAX NO.

7. Press **MENU**.



Note:

- You can enter your logo by pressing **+** or **-** in step (4). In this case, press **▶** to move the cursor.

To correct a mistake

- Press **◀** or **▶** to move the cursor to the incorrect character, and make the correction.

To delete a character





- Move the cursor to the character you want to delete and press **STOP**.

To insert a character



1. Press **◀** or **▶** to move the cursor to the position to where you want to insert the character.
2. Press **MUTE** to insert a space and enter the character.




1.13.3. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

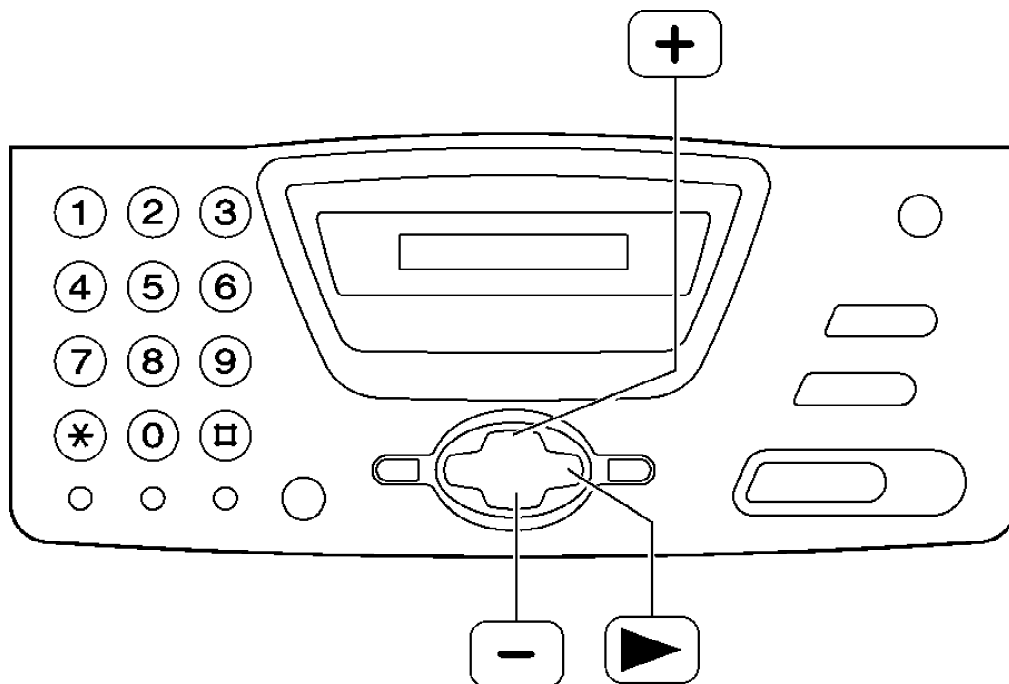
Pressing the dial keys will select a character as shown below.

Keys	Characters
①	1 [] { } + - / = , . ' : ; ?
②	A B C a b c 2
③	D E F d e f 3
④	G H I g h i 4
⑤	J K L j k l 5
⑥	M N O m n o 6
⑦	P Q R S p q r s 7
⑧	T U V t u v 8
⑨	W X Y Z w x y z 9
⑩	0 () < > ! " # \$ % & ¥ * @ ^ ' →
FLASH	HYPHEN button (To insert a hyphen.)
MUTE	INSERT button (To insert one character or one space.)
STOP	DELETE button (To delete a character.)
	 key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.
	 key (To move the cursor to the left.)

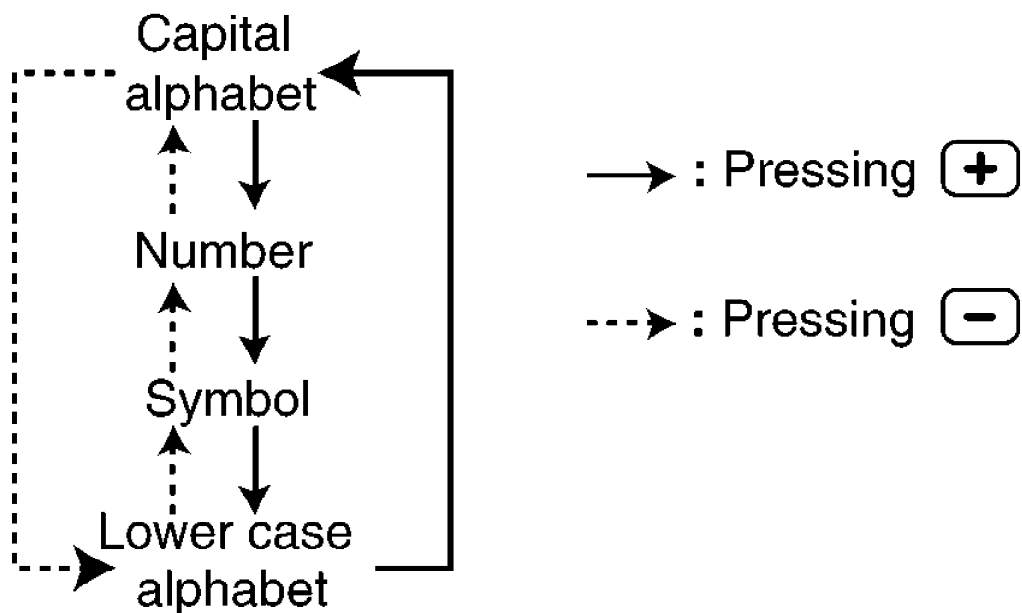
1.13.4. TO SELECT CHARACTERS USING or

Instead of pressing the dial keys, you can select characters using  or .

1. Press  or  until the desired character is displayed.
2. Press  to move the cursor to the next space.
 - The character displayed in step 1 is inserted.
3. Return to step 1 to enter the next character.



Display order of characters



1.13.5. SETTING THE DIAL LOCK

The dial lock feature prevents the unit from calls being made to any numbers, except for pre-stored emergency telephone numbers.

1. Press **MENU** .

DIAL LOCK

2. Press **SET** .

CODE=

3. Enter your PIN(Personal identification Number) code, from 2 to 4 digits, using 0-9.

If you want to release the PIN code, refer to #531 on the **SERVICE FUNCTION TABLE** ()

4. Press **SET** .

E01=

5. Enter an emergency telephone number, up to 30 digits, using the dial keypad.

6. Press **SET**.

- The next feature will be displayed.

E02=

7. If necessary, enter the second emergency telephone number using the dial keypad.

- If you do not need to enter, skip to step 8.

8. Press **SET**.

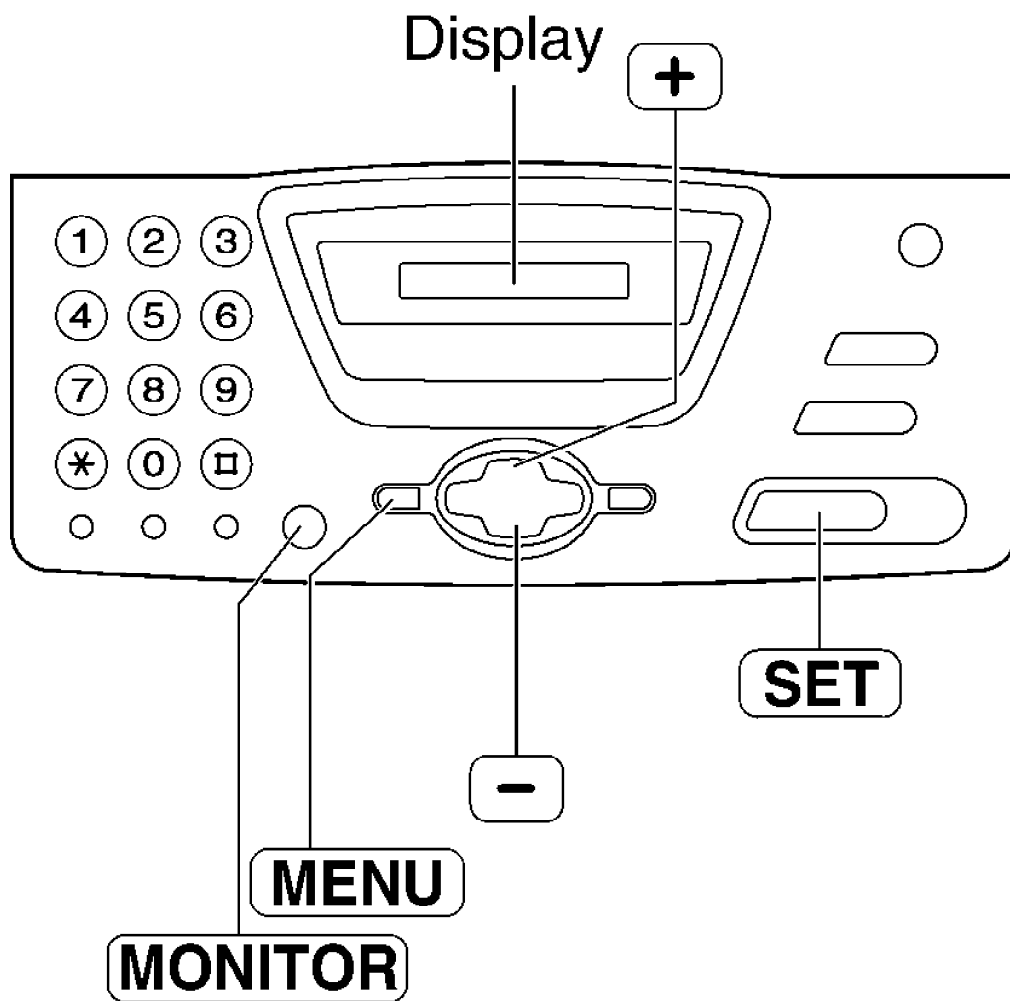
E03=

9. If necessary, enter the third emergency telephone number using the dial keypad.

- If you do not need to enter, skip to step 10.

10. Press **SET**.

DIAL LOCK



Note:

1. To correct/delete an emergency telephone number, see the bottom right.

To correct a mistake

Press ◀ or ▶ to move the cursor to the incorrect character/number, and make the corection.

To delete a character/number

Move the cursor to yhe character/number you want to delete, and press **STOP**

2. You can also enter an emergency telephone number using the directory in steps 5,7 and 9. Press

NOTATION PUBLIC "-//ALDUS//NOTATION TAGGED IMAGE FILE FORMAT//EN"
ENTITY SYSTEM "\\Osc_server\sm_sgml\FAX\KX-FT77LA\ft77LA_plus.tif" **or**

NOTATION PUBLIC "-//ALDUS//NOTATION TAGGED IMAGE FILE FORMAT//EN"
ENTITY SYSTEM "\\Osc_server\sm_sgml\FAX\KX-FT77LA\ft77LA_minus.tif"

until the desired name is displayed, then press

```
NOTATION PUBLIC "-//ALDUS//NOTATION TAGGED IMAGE FILE FORMAT//EN"
ENTITY SYSTEM "\\Osc_server\sm_sgml\FAX\KX-FT77LA\ft77LA\_set.tif".
```

Press

```
NOTATION PUBLIC "-//ALDUS//NOTATION TAGGED IMAGE FILE FORMAT//EN"
ENTITY SYSTEM "\\Osc_server\sm_sgml\FAX\KX-FT77LA\ft77LA\_set.tif".
```

Making an emergency call

1. Press **MONITOR** to lift the handset while the unit displays the following.
Display:

-The display will show the following.
Example:

2. Press **+** or **-** until the desired emergency telephone number is displayed.
Example:

3. Press **SET**

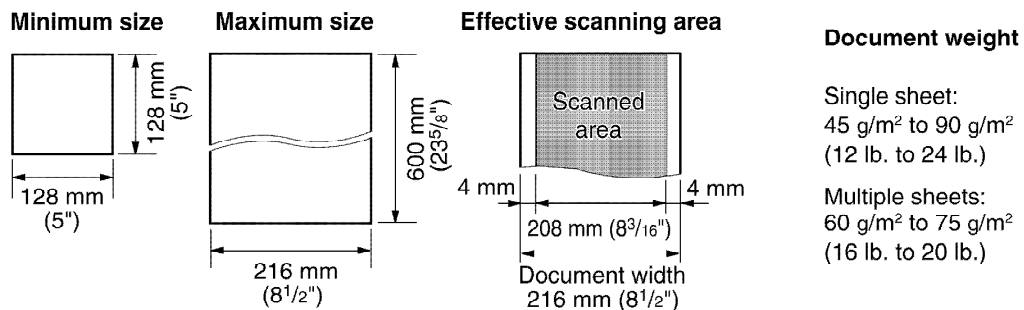
-The unit will start dialing automatically.

-If any documents are in the document entrance, the unit will start fax transmission..

To cancel the dial lock

1. Follow steps 1-3 on the left.
2. Press **SET**.

1.13.6. DOCUMENTS YOU CAN SEND



Note:

- Remove clips, staples or other similar fasteners.
- Check that ink, paste or correction fluid has dried.
- Do not send the following types of documents:(Use copies for fax transmission.)
 - Chemically treated paper such as carbon or carbonless duplicating paper
 - Electrostatically charged paper
 - Badly curled, creased or torn paper
 - Paper with a coated surface
 - Paper with a faint image

- Paper with printing on the opposite side that can be seen through the front (i.e. newspaper)
- To transmit the document(s) with a width of less than A4 size (210mm), we recommend using a copy machine to copy the original document onto A4 or letter-sized paper, then transmit the copied document.

1.14. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1.14.1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1. Periodic maintenance

Inspect the equipment periodically and if necessary, clean any contaminated parts.

2. Check for breakdowns

Look for problems and consider how they arose. / If the equipment can be still used, perform copying, self testing or communication testing.

3. Check equipment

Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.

4. Determine causes

Determine the causes of equipment problem by troubleshooting.

5. Equipment repairs

Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur.

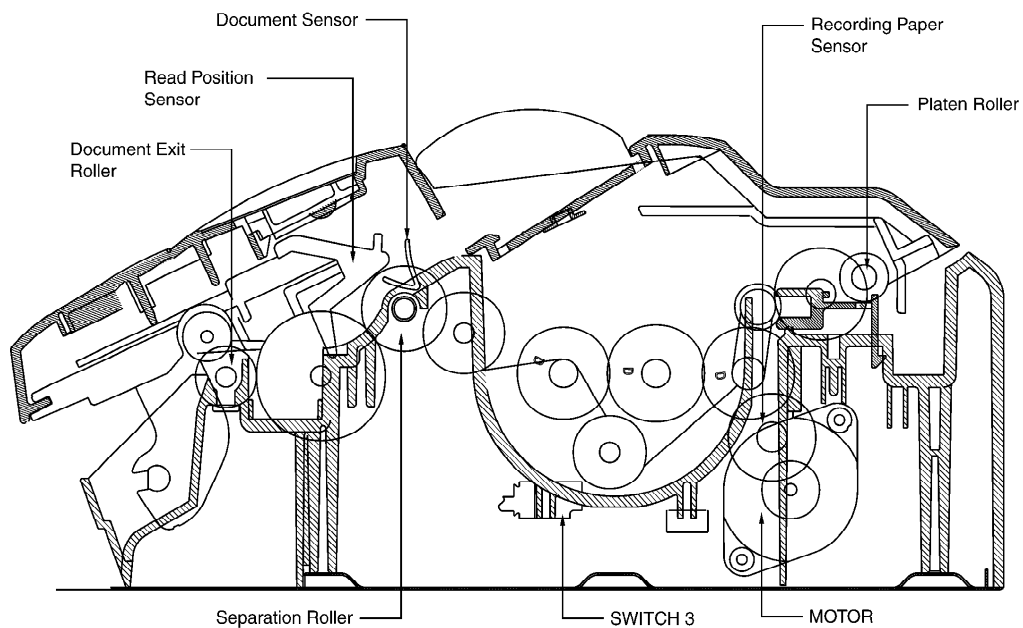
6. Confirm normal operation of the equipment

After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7. Record keeping

Make a record of the measures taken to rectify the problem for future reference.

1.14.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS



1.14.2.1. MAINTENANCE LIST

NO.	OPERATION	CHECK	REMARK
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	See CLEANING (
3	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth moistened with denatured alcohol (alcohol without water), then dry thoroughly.	See CLEANING (DISASSEMBLY INSTRUCTIONS
4	Glass	If the glass is dirty, clean the with a dry soft cloth.	See CLEANING (
5	Sensors	Document sensor (PS1), Read position sensor (PS2), Recording paper/cover open sensor (SW1) Jam sensor (SW3).	See SENSOR SE and SENSORS A SWITCHES () .
6	Abnormal, wear and tear or loose parts	If the glass is dirty, clean them with a dry soft cloth.	—

1.14.2.2. MAINTENANCE CYCLE

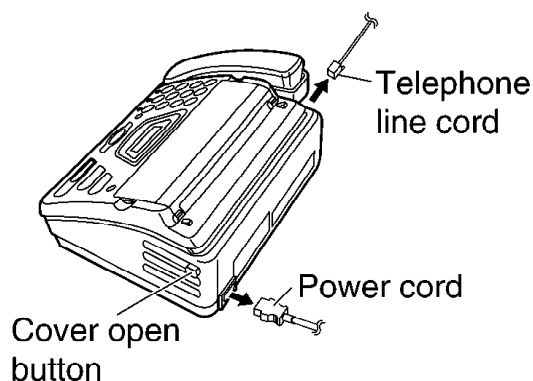
No.	Item	Cleaning Cycle	Replacement	
			Cycle	Procedure
1	Separation Roller (Ref. No. 72)	3 months	7 years* (100,000 documents)	See HOW TO REMOVE THE MC BLOCK AND SEPARATION RO
2	Separation Rubber (Ref. No. 21)	3 months	7 years* (100,000 documents)	See HOW TO REMOVE THE MC BLOCK AND SEPARATION RO
3	Feed Rollers (Ref. No. 58)	3 months	7 years* (100,000 documents)	See HOW TO REMOVE THE MC BLOCK AND SEPARATION RO
4	Thermal Head (Ref. No. 53)	3 months	7 years* (100,000 documents)	See HOW TO REMOVE THE MC BLOCK AND SEPARATION RO

1.14.3. CLEANING

1.14.3.1. DOCUMENT FEEDER

If misfeeding occurs frequently or if dirty patterns or black or white bands appear on a copied or transmitted document or the original of a copied document, clean the document feeder.

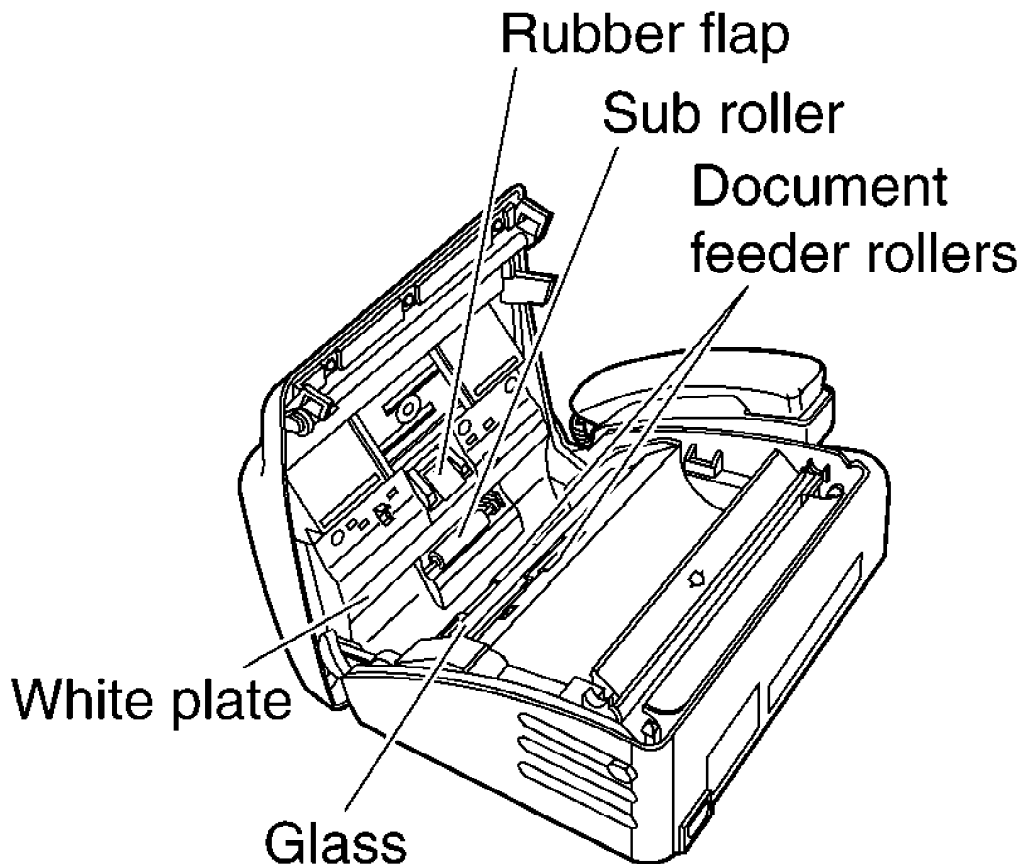
1. Disconnect the power cord and the telephone line cord.
2. Open the cover by pressing the cover open button.



3. Clean the document feeder rollers, sub roller and rubber flap with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.
4. Clean the white plate and glass with a soft dry cloth.
5. Close the cover securely by pushing down on both sides.
6. Connect the power cord and the telephone line cord.

Caution:

Do not use paper products, such as paper towels or tissues, to clean the inside of the unit.



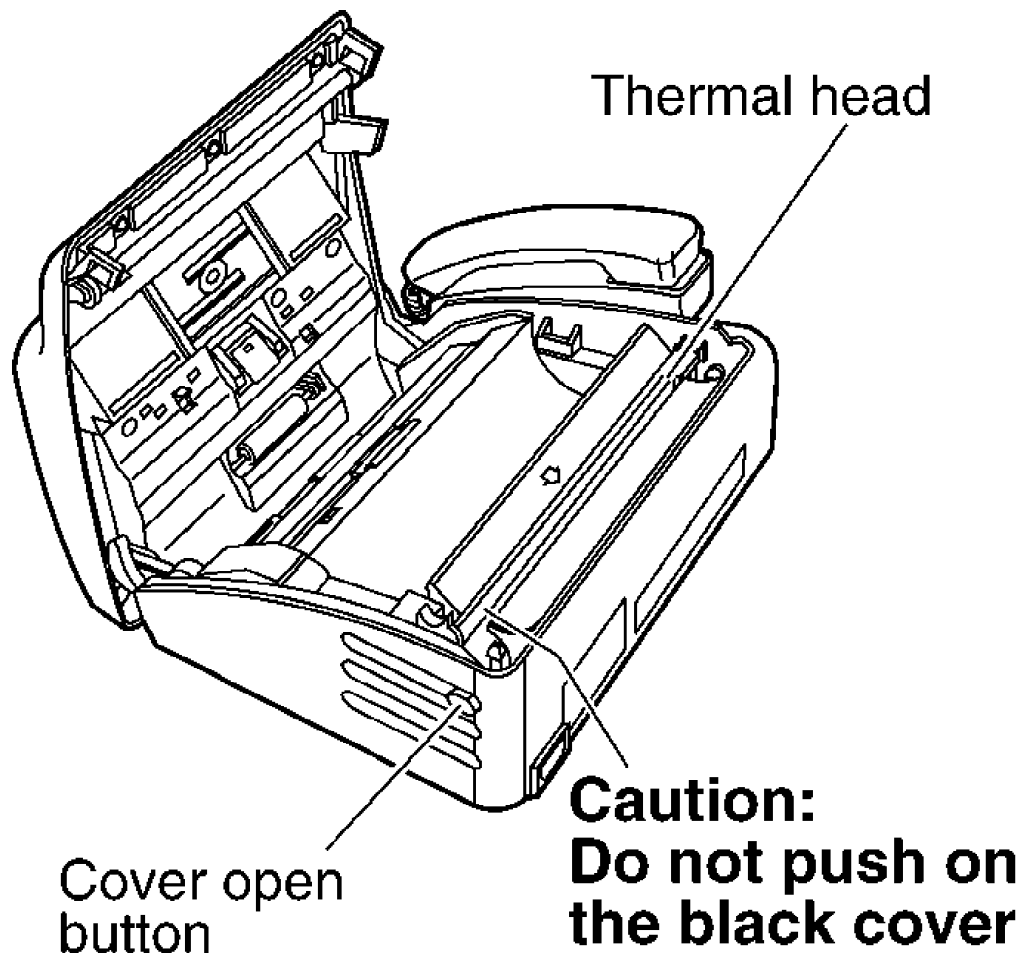
1.14.3.2. THE THERMAL HEAD

If dirty patterns or black or white bands appear on a copied or received document, check whether there is dust on the thermal head and clean the thermal head to remove the dust.

1. Disconnect the power cord and the telephone line cord.
2. Open the cover by pressing the cover open button.
3. Clean the thermal head with a cloth moistened with isopropyl rubbing alcohol, and let it dry thoroughly.
4. Close the cover securely by pushing down on both sides.
5. Connect the power cord and the telephone line cord.

Caution:

To prevent a malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly.



2. TROUBLESHOOTING GUIDE

2.1. TROUBLESHOOTING SUMMARY

2.1.1. TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

2.1.2. PRECAUTIONS

1. If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is set correctly without any slack.
2. Before troubleshooting, first check that the connectors and cables are connected correctly (not loose).
If the problem occurs randomly, check it very carefully.
3. When connecting the AC power cord with the unit case and

checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.

4. After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.

5. Always test to verify that the unit is working normally.

2.1.3. WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION

- How to use:

1. press **HELP**.

2. press **◀** or **▶** until the desired item is displayed.

3. press **SET**.

2.2. USER RECOVERABLE ERRORS

If the unit detects a problem, the following messages will appear on the display.

DISPLAY MESSAGE	CAUSE AND SOLUTION
CALL SERVICE 1	-There is something wrong with the unit. Contact our service personnel. / [This error is displayed when the thermal head does not warm up. Check the thermistor on the thermal head and connector lead.]
CALL SERVICE 2	-This message appears when the gear is not in an idle state. Check the GEAR BLOCK.
CHECK COVER	-The cover is open. Close it.
CHECK DOCUMENT	-The document was not fed into the unit properly. Reinsert the document. If misfeeding occurs frequently, check the document feeder rollers (Refer to DOCUMENT FEEDER ()) and try again. (Refer to DOCUMENT JAMS (SENDING) ().) -Attempted to transmit a document longer than 600 mm. Press STOP to remove the document. Divide the document into two or more sheets and try again.
CHECK MEMORY	-Memory (telephone numbers, parameters, etc.) has been erased. Re-program. / [The backup battery on the digital board may be low or dead, so check it.]
NO RESPONSE	-The other party's fax machine is busy or has run out of recording paper. Try again.
OUT OF PAPER	-The unit has run out of recording paper. Install a recording paper roll. / (Refer to INSTALLING THE RECORDING PAPER ().)
POLLING ERROR	-The other party's fax machine does not provide the polling function. Check with the other party.
REDIAL TIME OUT	-The other party's fax machine is busy or has run out of recording paper. Try again.
REMOVE DOCUMENT	-The document is jammed. Remove the jammed document. -[Alternately, turn off service code #559 to enable sending of documents longer than 600 mm] (Refer to DOCUMENT JAMS (SENDING) ().)
TRANSMIT ERROR	-A transmission error occurred. Try again.

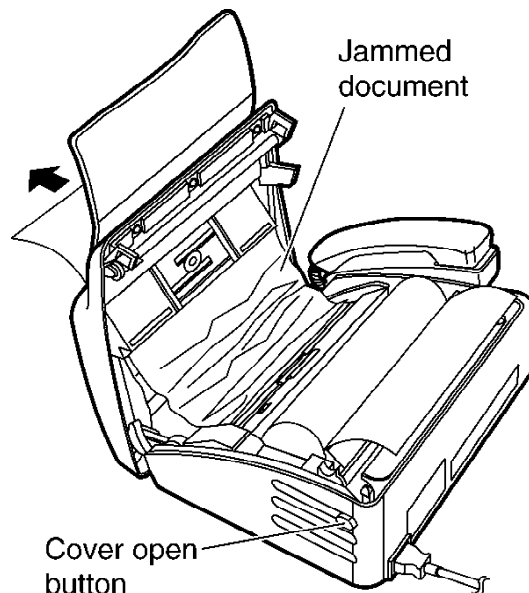
DISPLAY MESSAGE	CAUSE AND SOLUTION
UNIT OVERHEATED	-The unit is too hot. Let the unit cool down. / [If many copies are nearly all black, this message will be When this occurs, open the front cover and let the unit cool down.]

Notes: The explanations given in the [] are for servicemen only. /

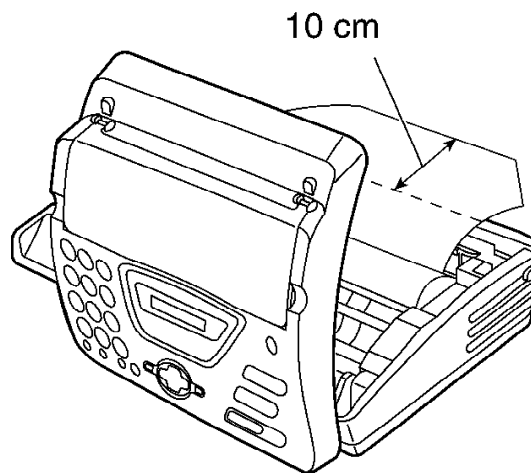
2.2.1. DOCUMENT JAMS (SENDING)

If the unit does not release the document during feeding, remove the jammed document as follows.

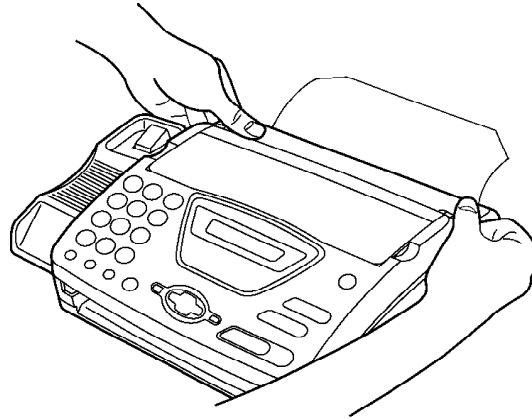
1. Open the cover by pressing the cover open button.
2. Remove the jammed document carefully.



3. Pull the leading edge of the recording paper approximately 10 cm (4 inches) out of the unit.
 - Make sure that there is no slack in the paper roll.



4. Close the cover securely by pushing down on both sides.



5. Tear off the excess paper by pulling it towards you.



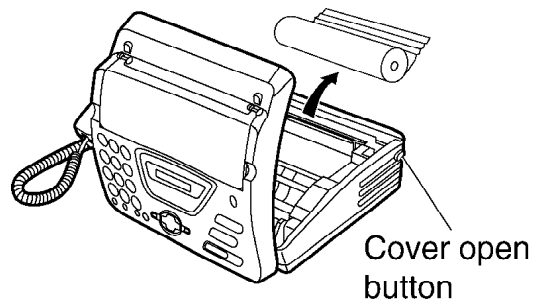
Note:

- Do not pull out the jammed document forcibly before opening the cover.

2.2.2. RECORDING PAPER JAM

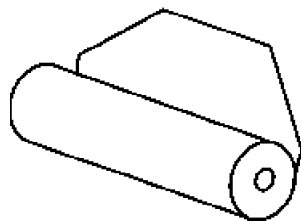
If the unit does not eject any recording paper during fax reception or copying, the recording paper has jammed. Remove the jammed paper as shown below.

1. Open the cover by pressing the cover open button and remove the recording paper roll.

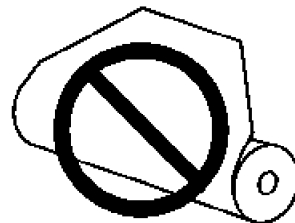


2. Replace the recording paper roll in the proper direction, and pull the leading edge of the paper approximately 10 cm (4 inches) out of the unit.

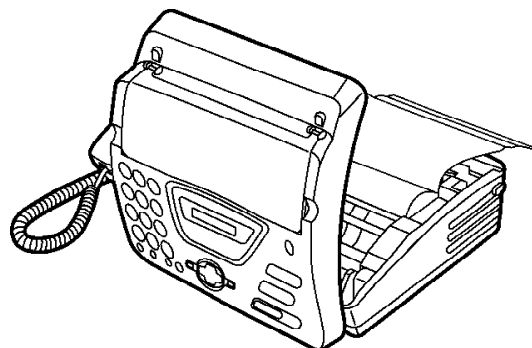
Correct



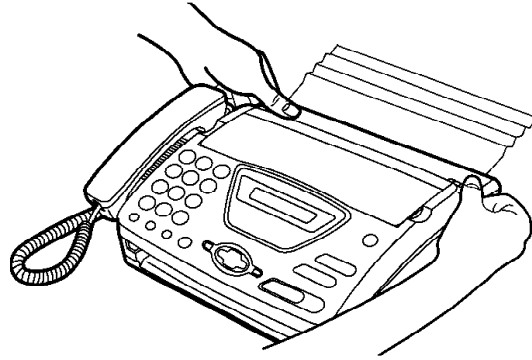
Incorrect



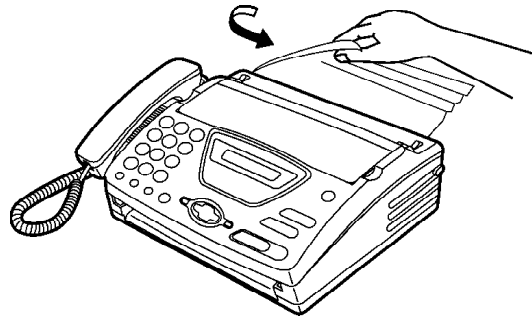
- Make sure that there is no slack in the paper roll.



3. Close the cover securely by pushing down on both sides.



4. Tear off the excess paper by pulling it towards you.



Note:

- When the power cord is connected, every time you close the cover a message will be printed. If the recording paper is set to the wrong side, a message will not be printed. Install the paper correctly.**

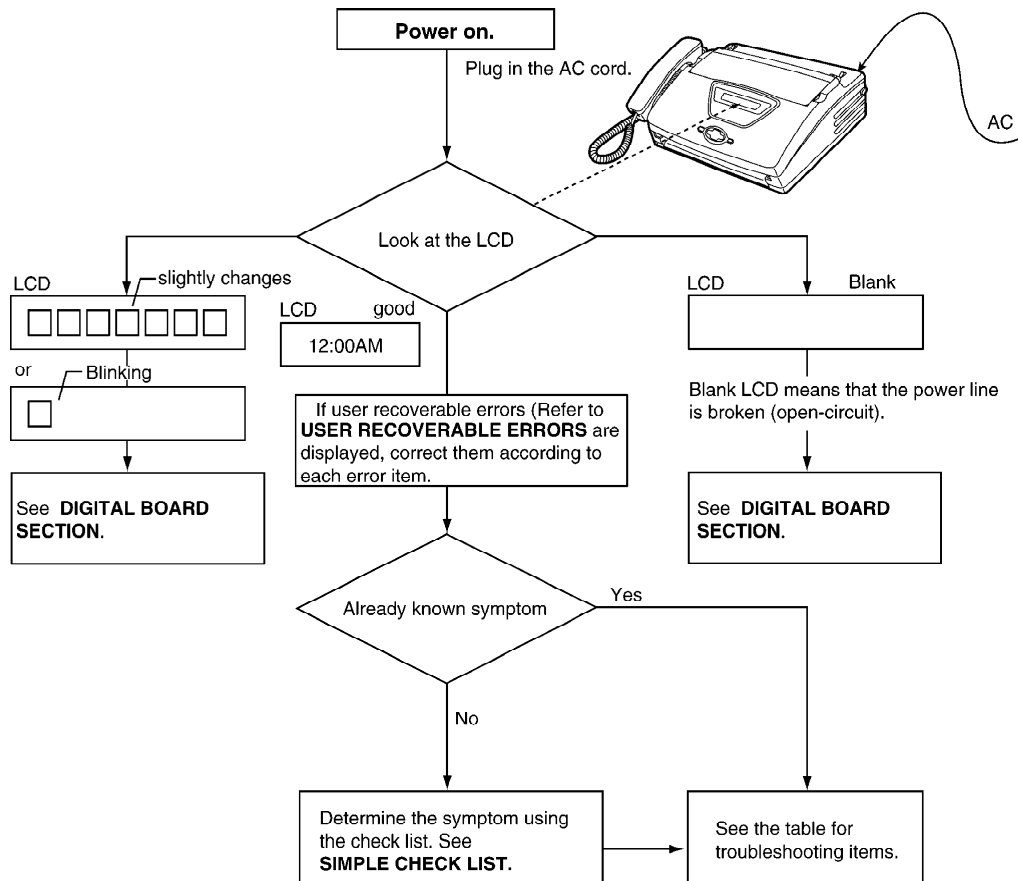
2.3. TROUBLESHOOTING DETAILS

2.3.1. OUTLINE

Troubleshooting guide provides a logical path of deduction to assist in locating a fault and suggests methods of restoring the unit to full working condition. Use the reported symptoms of the fault to determine the best troubleshooting method. Even difficult faults can be tracked to a specific block or area, for example, the "Digital Board" or "Image Sensor". / A variety of fault descriptions from customers often point to the same area and, for this reason, careful analysis of the reported symptoms is required. After every repair, test all functions to ensure no problems are evident.

2.3.2. STARTING TROUBLESHOOTING

Select the appropriate troubleshooting method according to the symptoms.



CROSS REFERENCE:
[USER RECOVERABLE ERRORS \(\)](#)
[SIMPLE CHECK LIST \(\)](#)
[DIGITAL BOARD SECTION \(\)](#)

2.3.3. TROUBLESHOOTING ITEMS TABLE

FUNCTION	SYMPTOM	REFERENCE
Printing	Skewed receiving image	See SKEWED RECEIVING IMAGE ()
	Expanded print	See EXPANDER PRINT (WHEN PRINTING)
	Image is distorted	See IMAGE IS DISTORTED (WHEN PRINTING)
	Black or White vertical lines appear.	See BLACK OR WHITE VERTICAL LINES APPEAR ()
ADF (Auto Document Feeder)	No feed	See NO DOCUMENT FEED ()
	Paper jam	See DOCUMENT JAM ()
	Multiple feed	See MULTIPLE FEED ()
	Skew	See SKEW ()
Abnormal mechanical sound	Abnormal sound from the product	See WHEN COPYING OR PRINTING, AN ABNORMAL SOUND IS HEARD FROM THE PRODUCT ()
Power supply	Voltage output is abnormal.	See POWER SUPPLY BOARD SECTION
Operation panel	keys are not accepted.	See OPERATION BOARD SECTION ()
Sensor	If the electric circuit is the cause, "REMOVE DOCUMENT" will be displayed.	See SENSOR SECTION ()
Communication FAX, TEL (Analog/Digital board)	Cannot communicate by fax.	See DEFECTIVE ITS (INTEGRATED TELEPHONE SYSTEM) SECTION ()
	Error code is displayed.	See HOW TO OUTPUT THE JOURNAL ()
	Cannot talk.	See ANALOG BOARD SECTION ()
	DTMF tone doesn't work.	
	Handset/Monitor sound, volume	

2.3.3.1. SIMPLE CHECK LIST

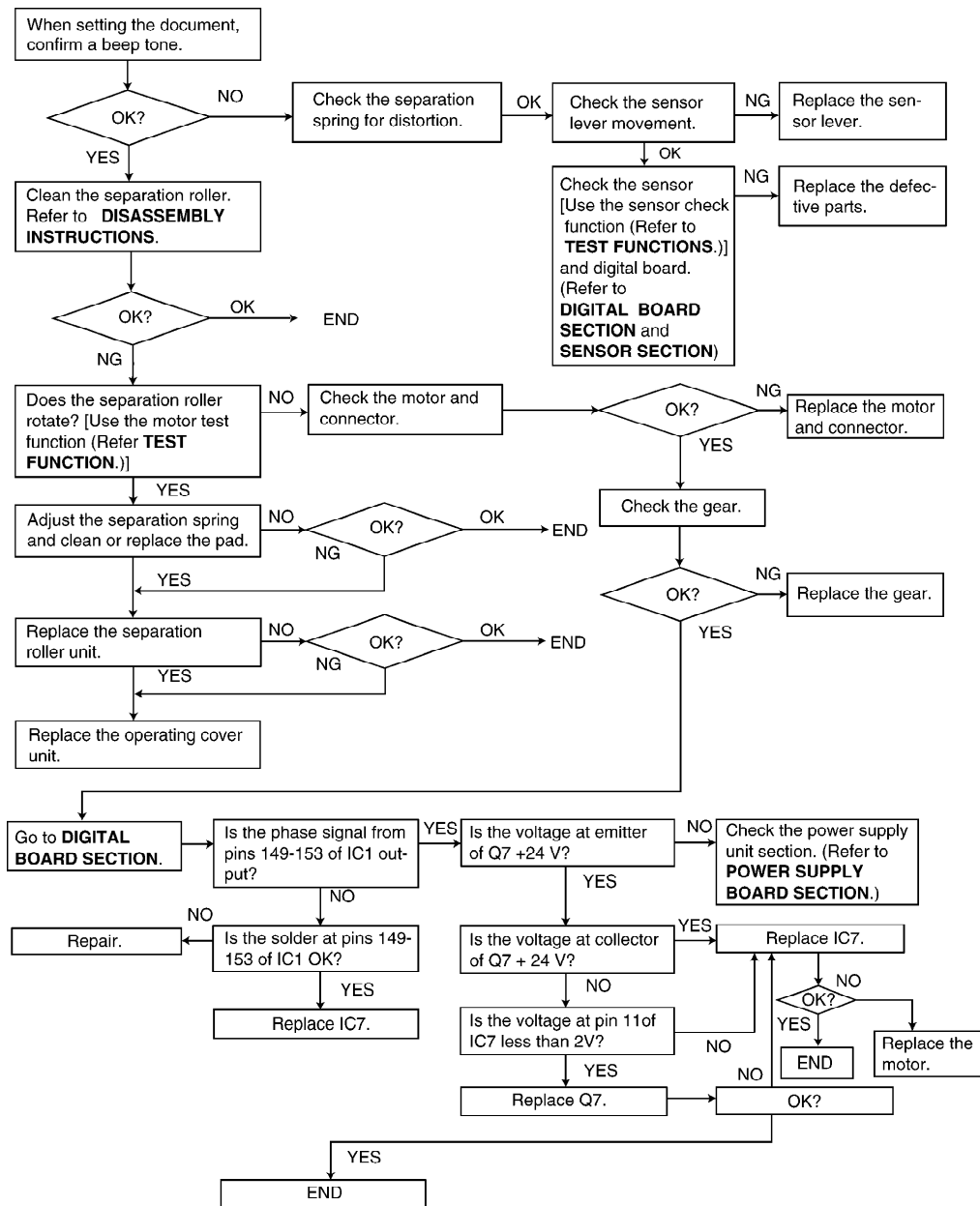
SERIAL NO.		DATE	
FUNCTION		JUDGEMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation	FINE mode	OK / NG	
	PHOTO mode	OK / NG	
Telephone operation	Handset transceiver / receiver	OK / NG	
	Monitor sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
Operation Panel	Key check	OK / NG	Service code #561 (Refer to TEST FUNCTION
	LCD check	OK / NG	Service code #558 (Refer to TEST FUNCTION
Sensor	Sensor check	OK / NG	Service code #815 (Refer to TEST FUNCTION
Clock		OK / NG	Is the time kept correctly? Check with another clock.
External Telephone	Handset transceiver/receiver	OK / NG	
	Remote control	OK / NG	Change to FAX receiving I pressing * 9. (Refer to code no. 041.on PROGRAM MODE TABLE

Note:

- Check according to the service code referring to the **TEST FUNCTIONS** ().

2.3.4. ADF (AUTO DOCUMENT FEED) SECTION

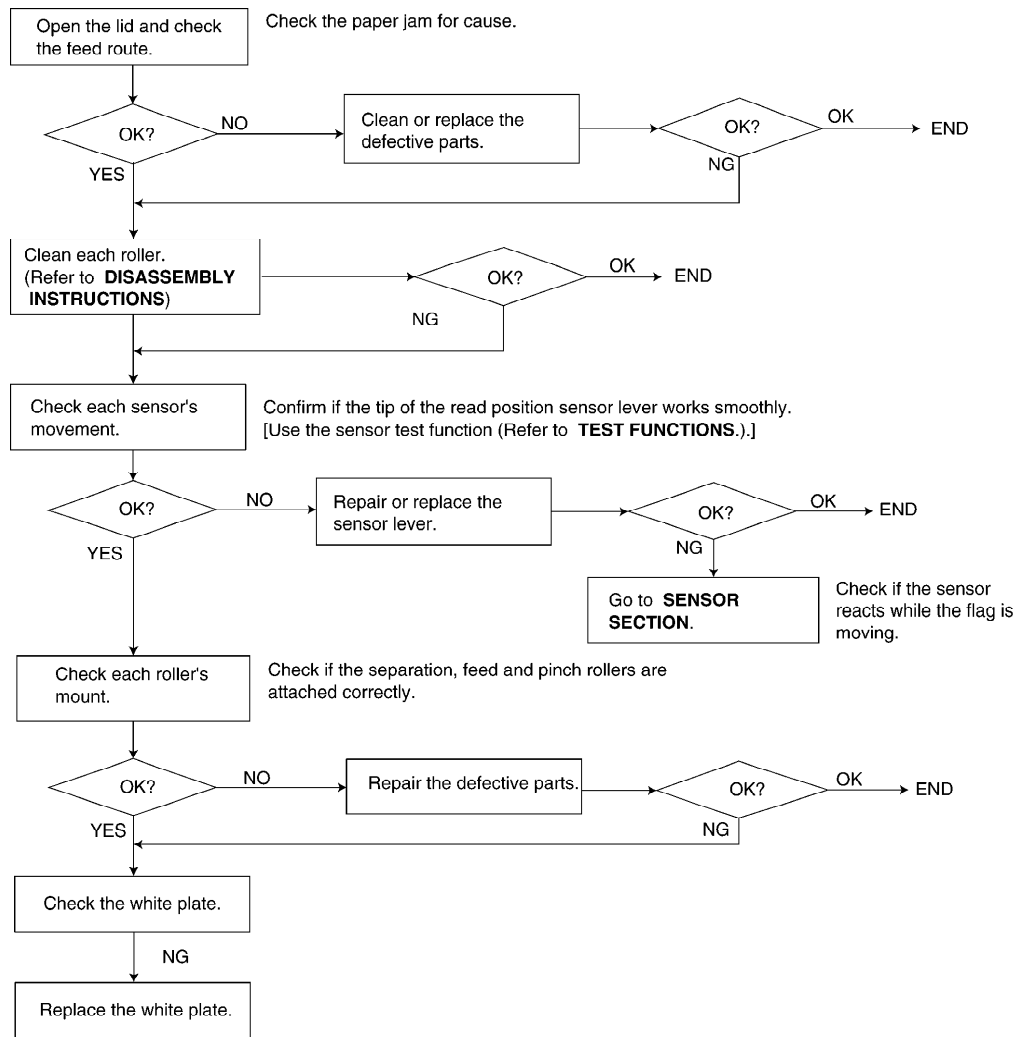
2.3.4.1. NO DOCUMENT FEED



CROSS REFERENCE:

[DIGITAL BOARD SECTION \(\)](#)
[POWER SUPPLY BOARD SECTION \(\)](#)
[SENSOR SECTION \(\)](#)
[TEST FUNCTIONS \(\)](#)
[DISASSEMBLY INSTRUCTIONS \(\)](#)

2.3.4.2. DOCUMENT JAM

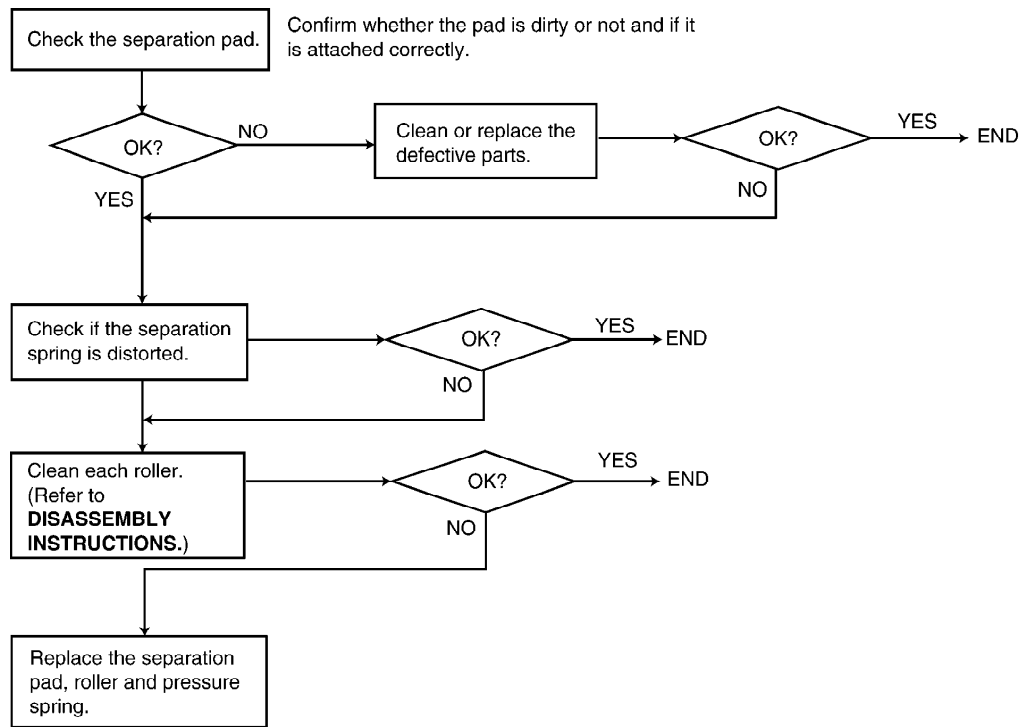


CROSS REFERENCE:

SENSOR SECTION ()

DISASSEMBLY INSTRUCTIONS ()

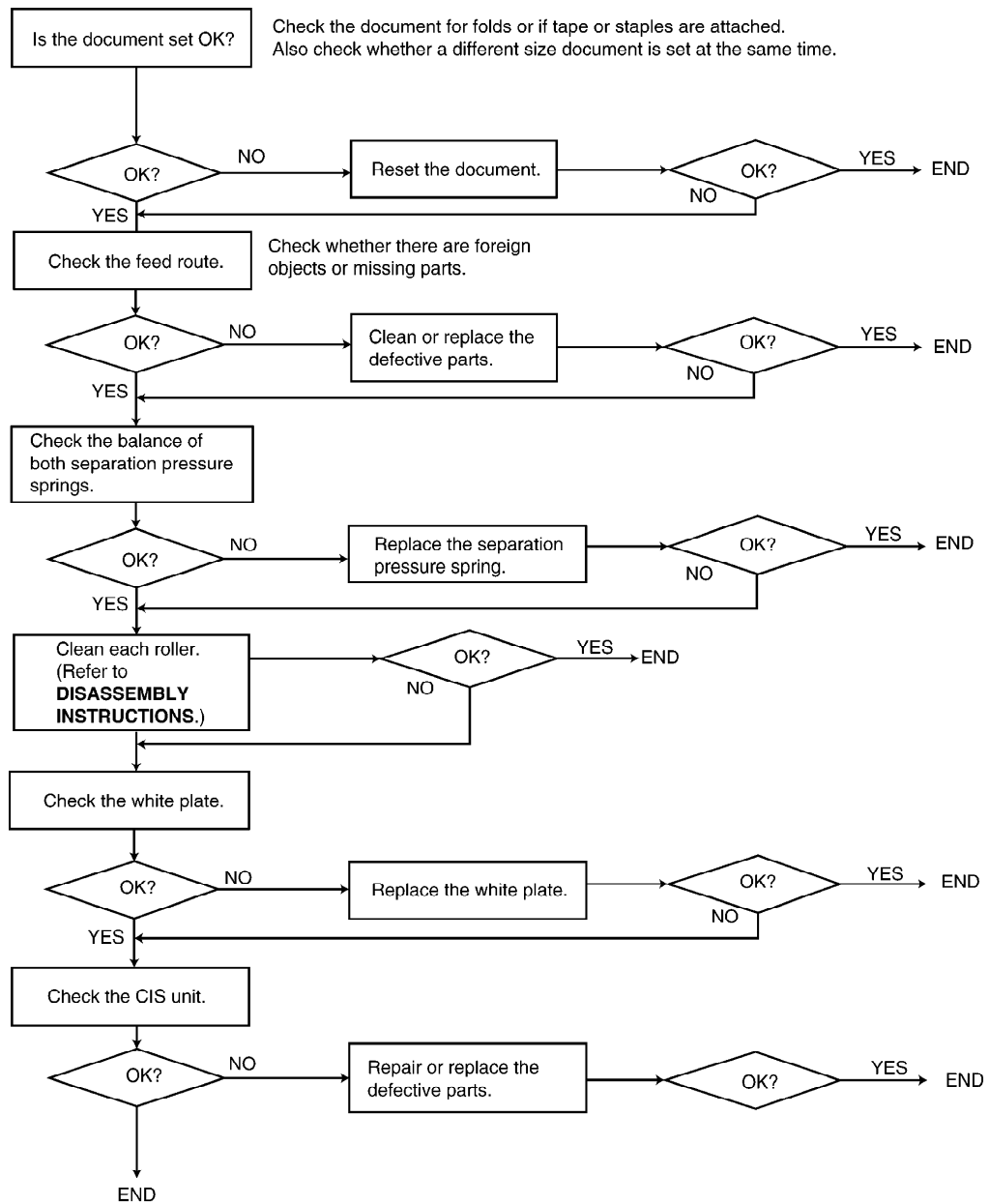
2.3.4.3. MULTIPLE FEED



CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

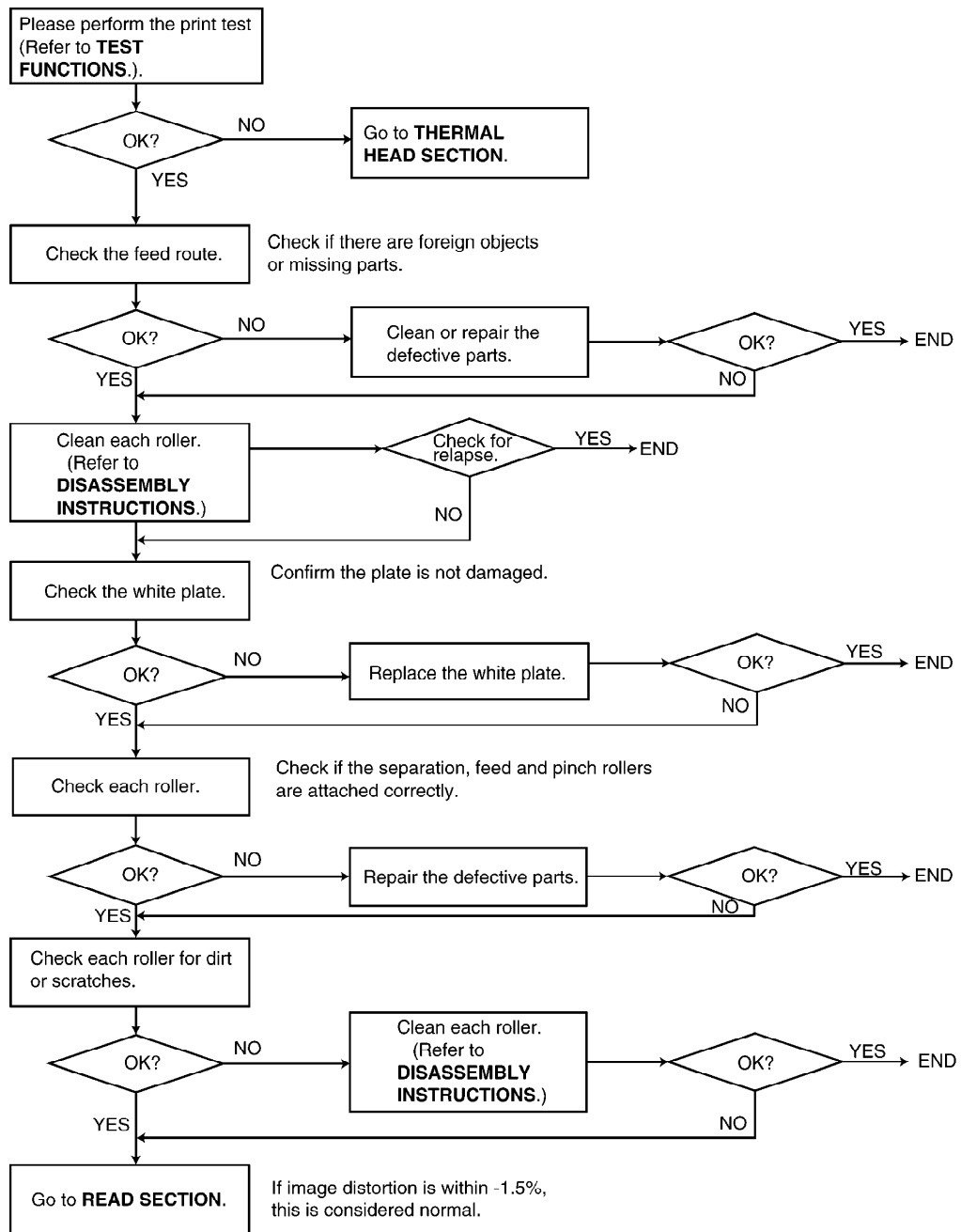
2.3.4.4. SKEW



CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

2.3.4.5. IMAGE IS DISTORTED (WHEN PRINTING)



CROSS REFERENCE:

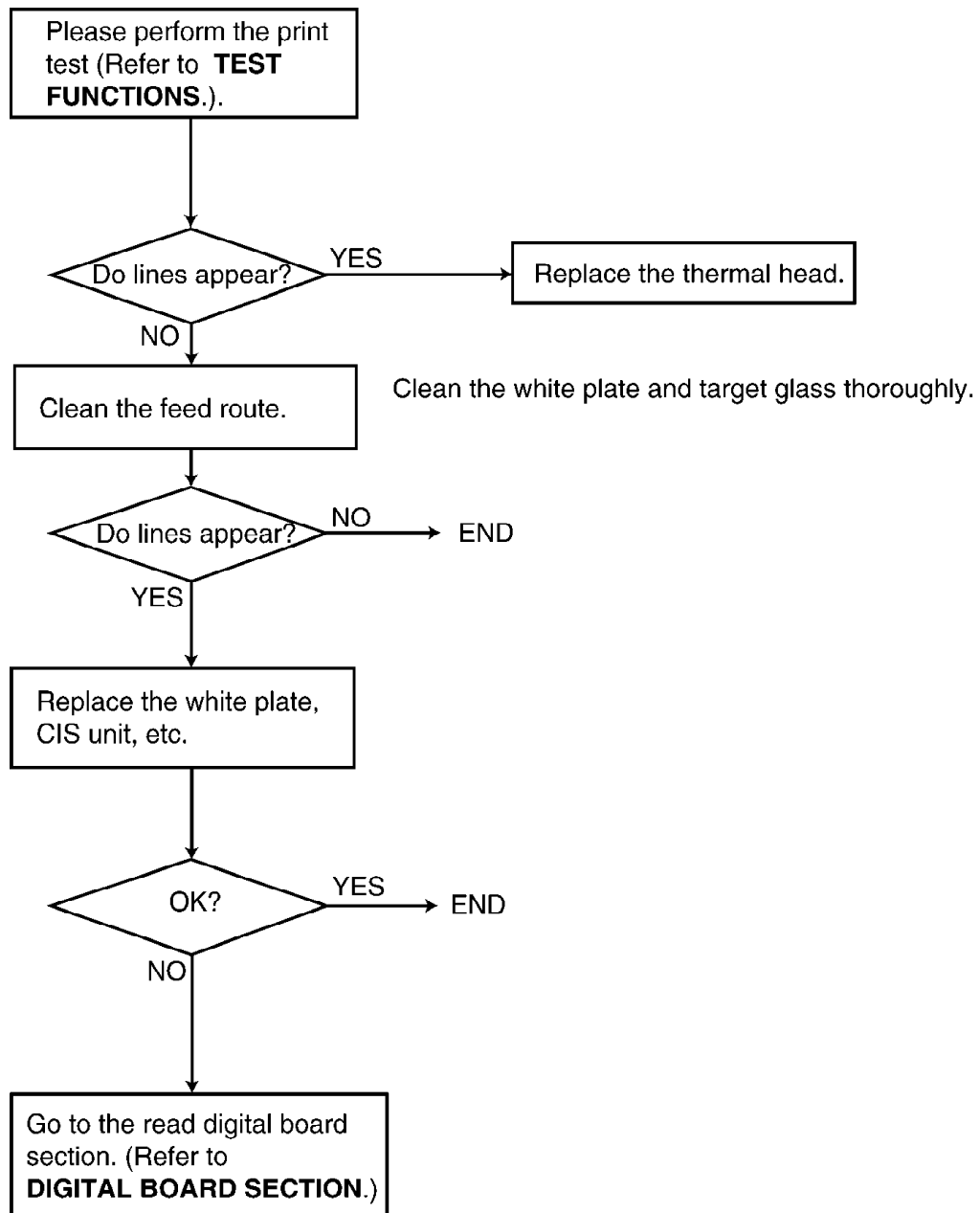
READ SECTION ()

THERMAL HEAD SECTION ()

TEST FUNCTIONS ()

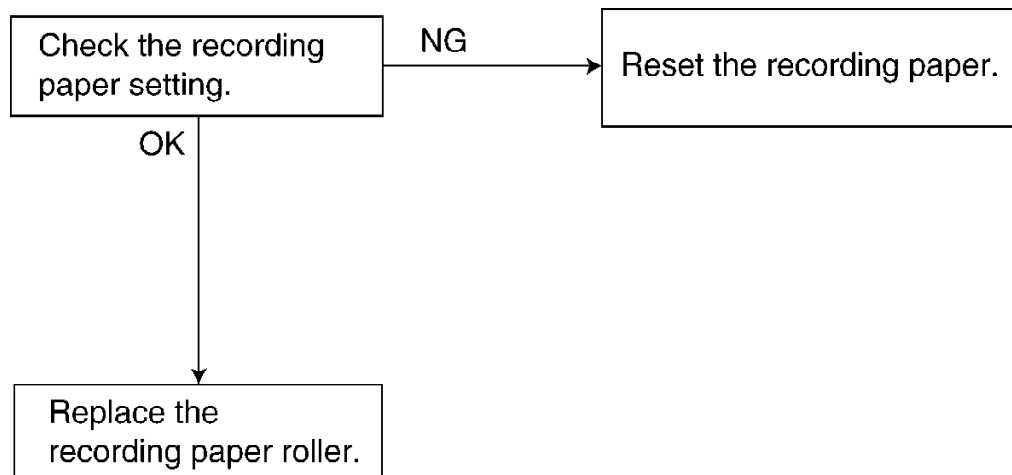
DISASSEMBLY INSTRUCTIONS ()

2.3.4.6. BLACK OR WHITE VERTICAL LINES APPEAR

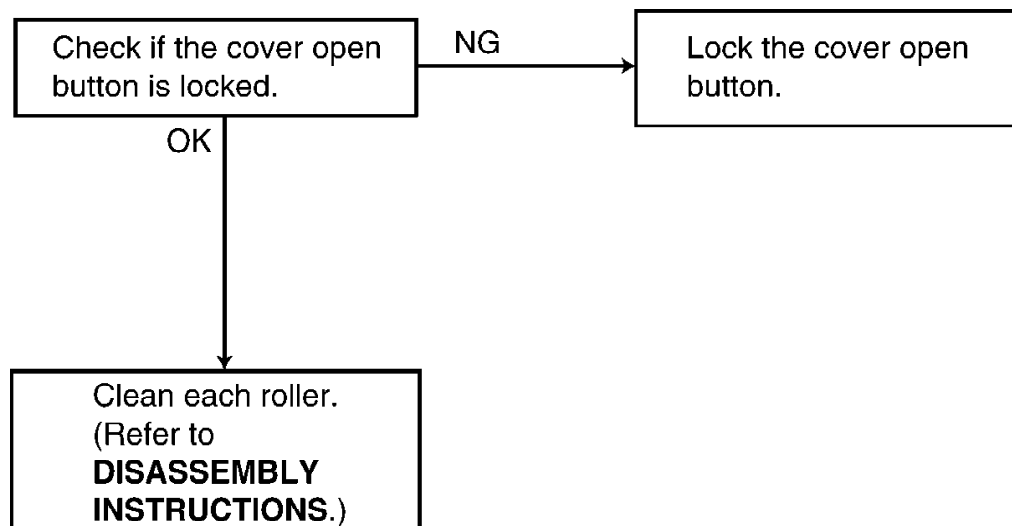


CROSS REFERENCE:
DIGITAL BOARD SECTION ()
TEST FUNCTIONS ()

2.3.4.7. SKEWED RECEIVING IMAGE



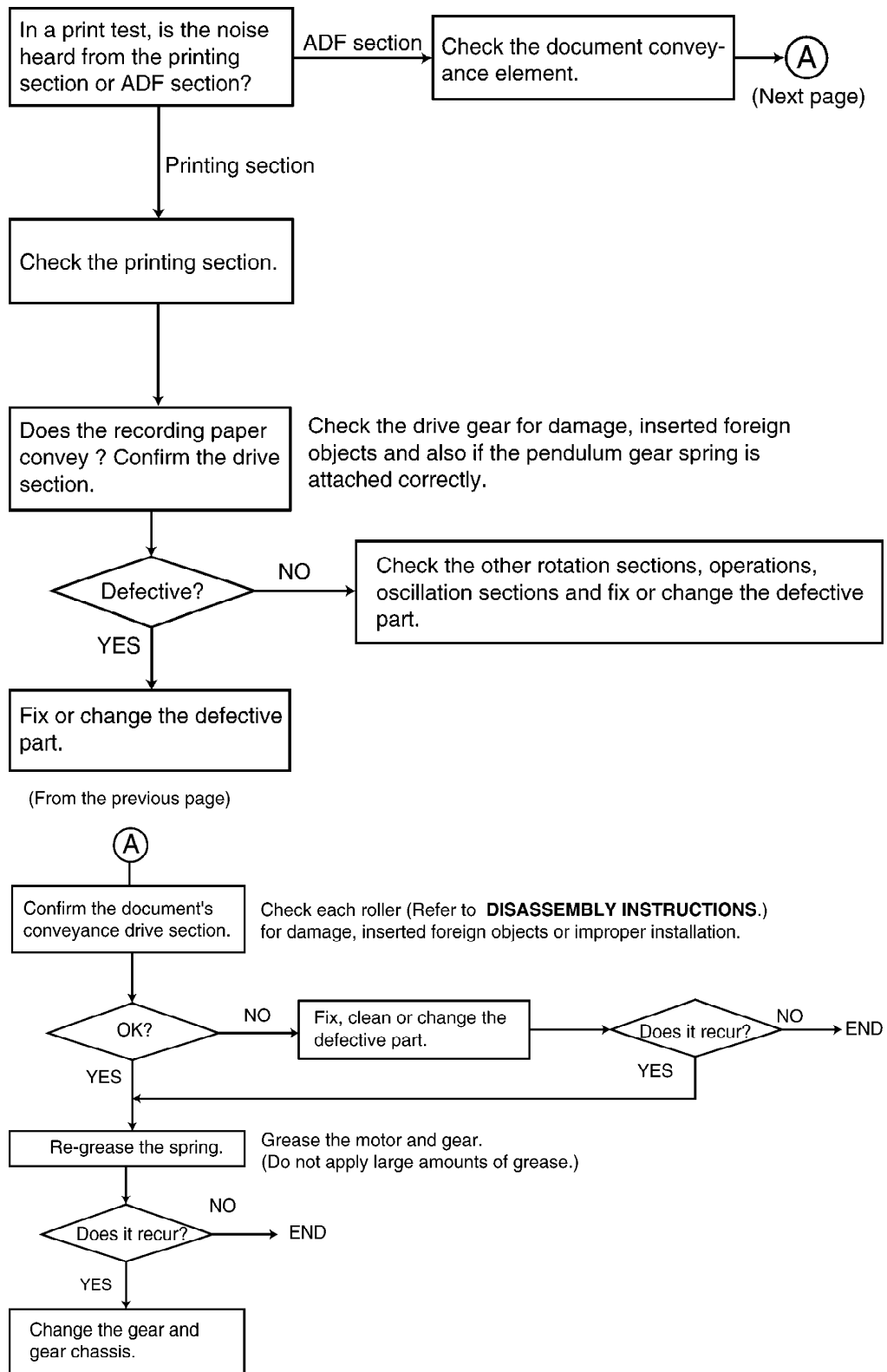
2.3.4.8. EXPANDER PRINT (WHEN PRINTING)



CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS ()

2.3.4.9. WHEN COPYING OR PRINTING, AN ABNORMAL SOUND IS HEARD FROM THE UNIT



CROSS REFERENCE:
DISASSEMBLY INSTRUCTIONS ()

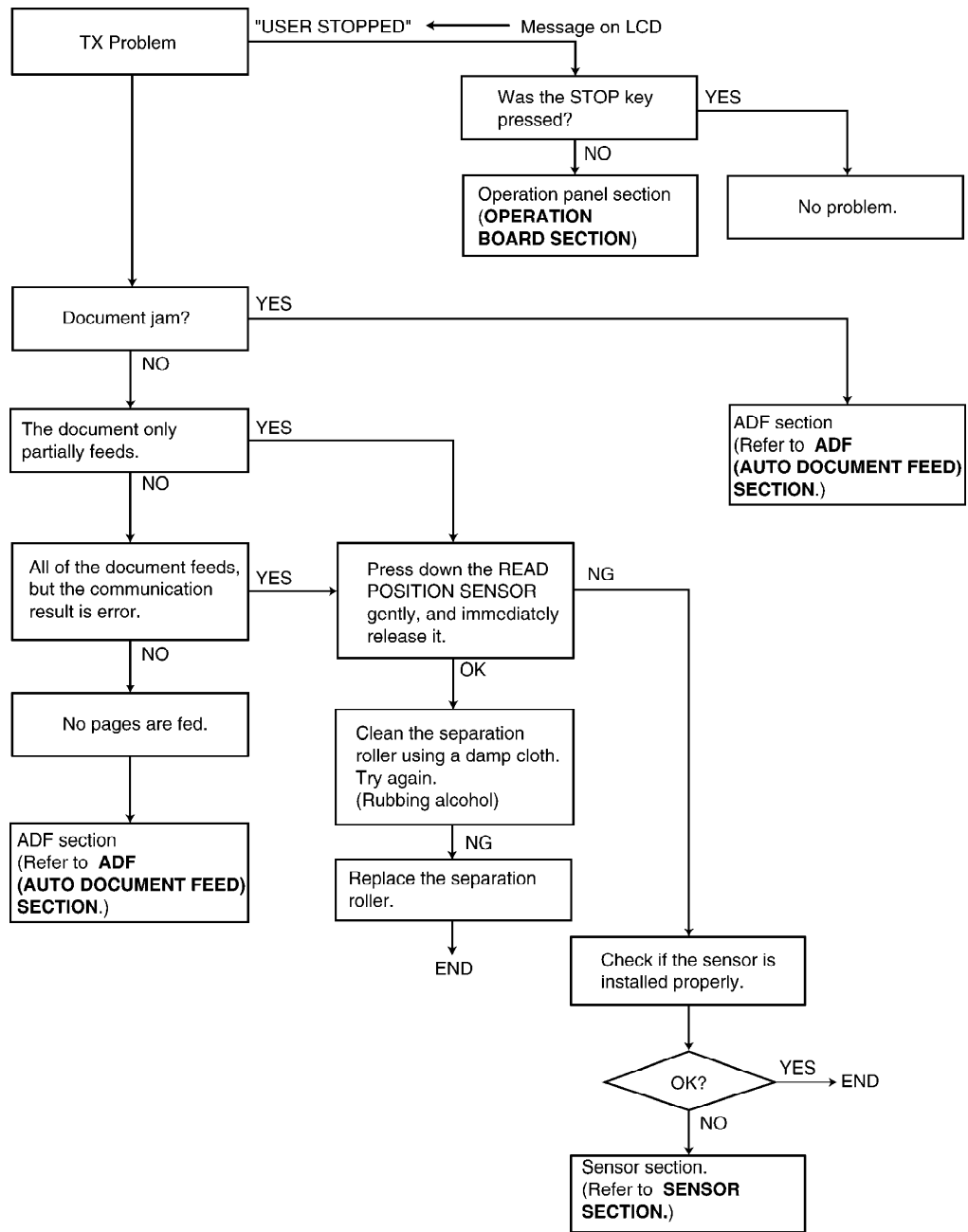
2.3.5. COMMUNICATION SECTION

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in **DEFECTIVE FACSIMILE SECTION** ().

No.	Symptom	Content	Possible cause
1	The paper is not fed properly when faxing. (Copying is also not possible.)	Troubleshooting	Problem with the feeding mechanism.
2	The fax usually transmits successfully but sometimes fails. (Copying is possible.)	Troubleshooting	Problem with the service line or with the receiver's fax.
3	The fax receives successfully one time and fails another. (Copying is possible.)	Troubleshooting	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (The unit can copy documents.)	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or an international call. (The unit can copy documents.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	

2.3.5.1. DEFECTIVE FACSIMILE SECTION

2.3.5.1.1. TRANSMIT PROBLEM



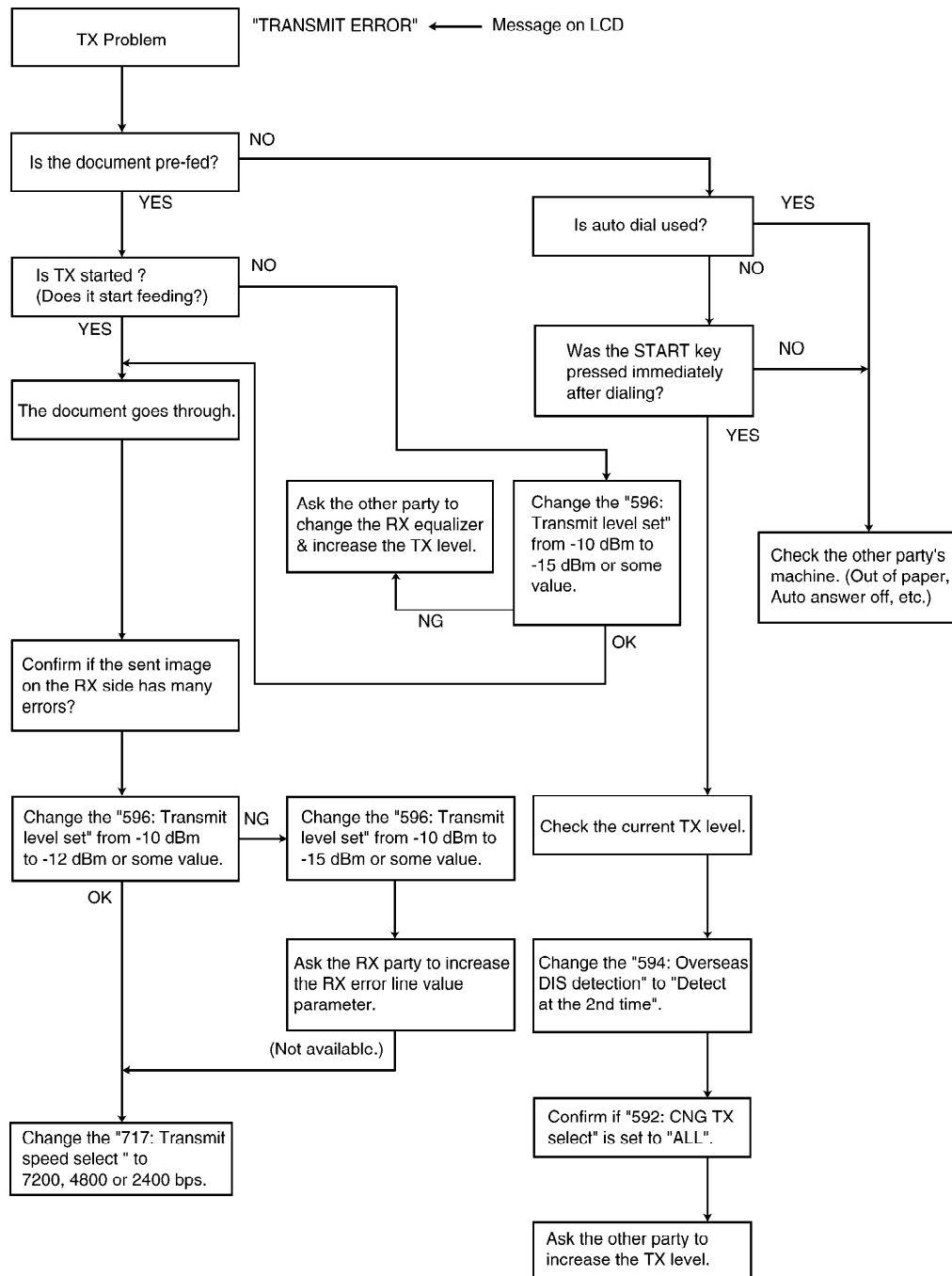
CROSS REFERENCE:

ADF (AUTO DOCUMENT FEED) SECTION ()

OPERATION BOARD SECTION ()

SENSOR SECTION ()

2.3.5.1.2. SOMETIMES THERE IS A TRANSMIT PROBLEM



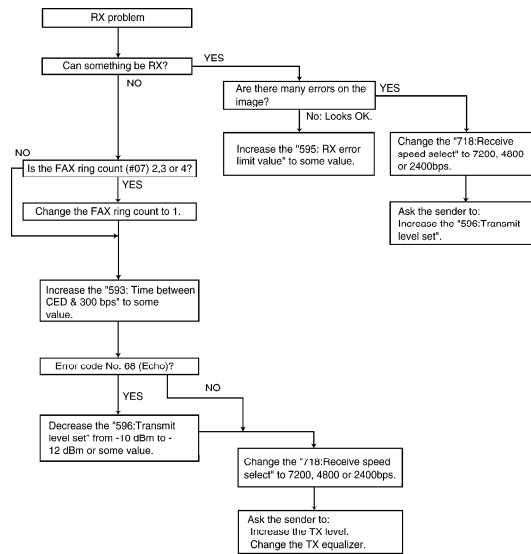
2.3.5.1.3. RECEPTION PROBLEM

Confirm the following before starting troubleshooting. / Is the recording paper installed properly?

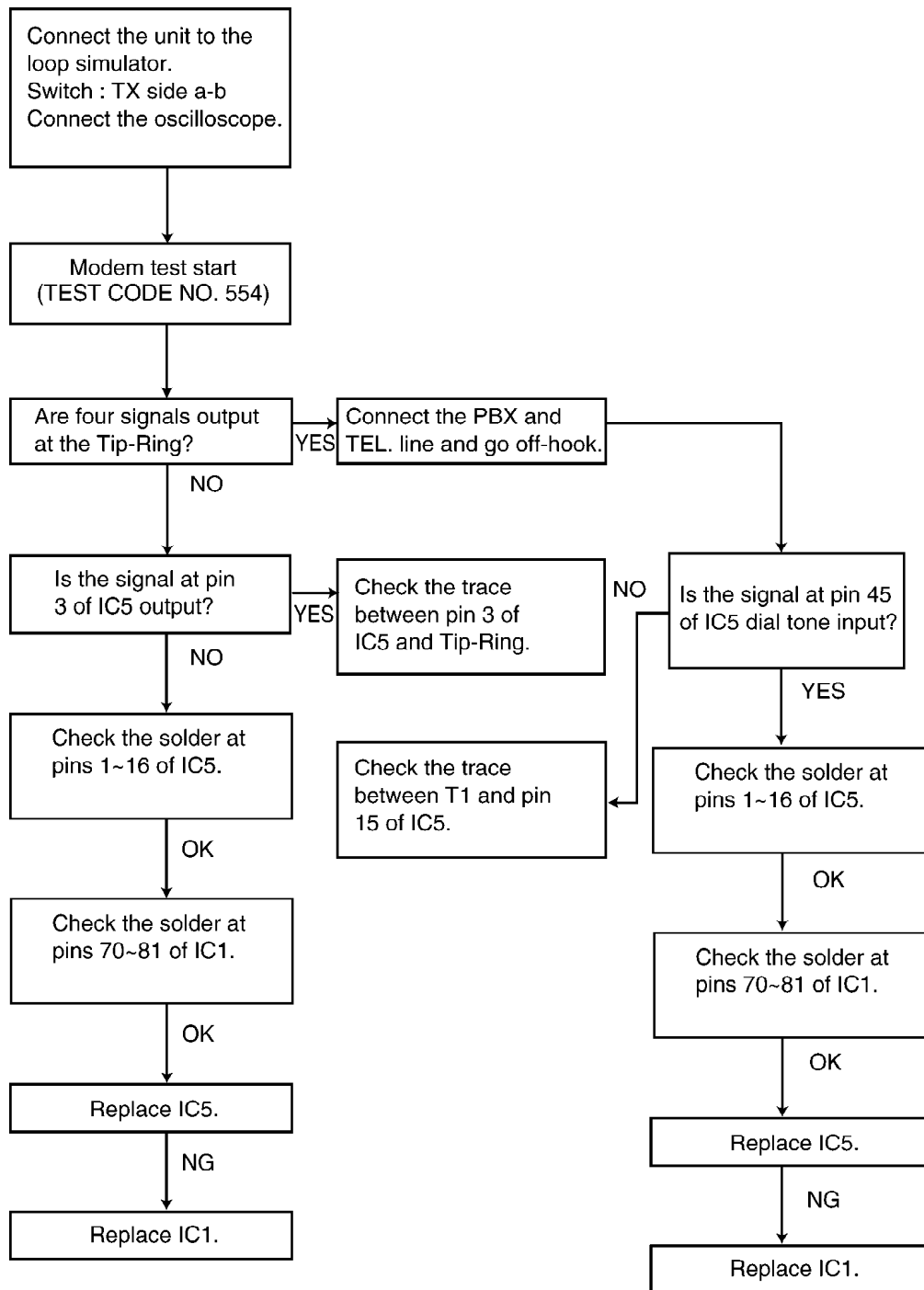
There is the receiving problem when sometimes the below errors may be occurred.

OUT OF PAPER / CHECK COVER / UNIT OVERHEATER(If it doesn't return automatically, **COVER OPEN**, etc., reset the unit.) / **CHECK DOCUMENT**

Please refer to **USER RECOVERABLE ERRORS** () for the above items. / Also, when a hardware deformity occurs, please check each sensor.



2.3.5.1.4. THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE



2.3.5.1.5. UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS

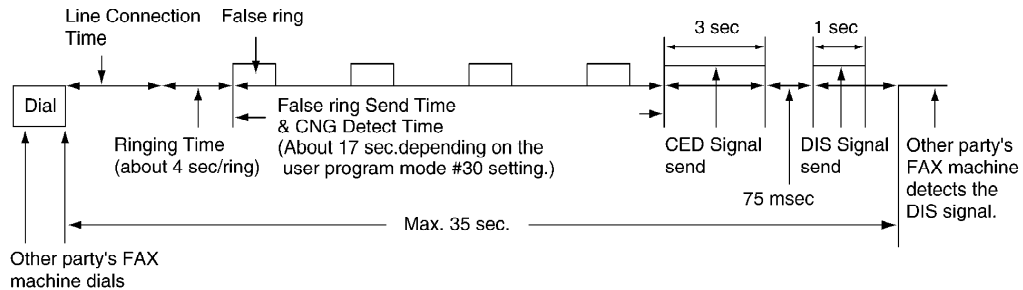
The following 2 causes can be considered for this.

Cause 1:

The other party is executing automatic dialling, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to the CED or DIS.) (According to the ITU-T standard, the communication procedure is stopped when there is no response from the other party within 35 sec, so that the

other party releases the line.)

(Response time)

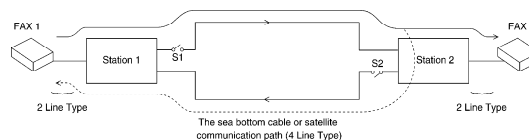


(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced. Long distance connection and linking of several stations means the line connection time cannot be reduced. Accordingly, the following countermeasures should be attempted. / (A) The TEL/FAX DELAYED RING count should be 1. (User parameter: code No. 78) / (B) As the 35 sec. count starts directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. / Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time will be delayed for 2 pauses (about 10 sec.).

Cause 2:

Erroneous detection due to an echo or echo canceler.



(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via the stations 1 and 2, but the reflection signal at station 2 also returns via station 1(echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 a max. of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1, station 2) attaches echo cancellers (S1, S2) for international lines or long distance lines. For the echo canceller, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

No.	Countermeasure Side	Echo Communication Problem Example	Countermeasure	Service
1	Sending side	Some time is needed to compare the level of the receiving and sending signals for the echo canceler. The header of the training signal lacks due to a switching delay to close S1.	Add a dummy signal to the beginning of the training signal.	Service code (International selection) This countermeasure becomes the value
2	Receiving side	The echo canceler function stops according to a CED signal frequency of 2100Hz (S1 and S2 are both ON), a DIS signal is returned as an echo, and a DCS signal from the sending side overlaps the DIS echo. Then the receiving side FAX cannot retrieve the DCS signal. (Refer to Fig. a)	Change to a 1100Hz CED signal frequency. (Refer to Fig. b)	Service code (CED frequency selection)
	Receiving side		Change the regular time of 75 msec between the CED signal and DIS signal to 500 msec. This will give at least 250 msec to recover the echo canceler operation. (Refer to Fig. c)	Service code (Time between CED and DIS)
	Sending side		The sending side FAX sends a DCS signal not after receiving the 1st DIS signal but after receiving the 2nd DIS signal. (Refer to Fig. d)	Service code (Overseas detection)
3	Sending side	Communication failure occurs in a long distance communication on the telephone line without an echo canceler.	Decrease the transmission level from -10 dBm to -15 dBm and the echo level will decrease.	Service code (Transmit level)
4	Sending side Receiving side	or	Decrease the receiving sensitivity from -13 dBm to about -32 dBm so an echo signal will not be received.	Service code (Receiving sensitivity)
5	Sending side Receiving side	There are some cases (e.g. Mobil comms.) which cause the collision of TX / RX signals due to the delay / echo and noise of the network / terminal. (Refer to Fig. e)	Set additional Pause time (Service mode: code No. 774) in between the original and its repeated signals, to prevent the collision of the signals at both ends.	Service code (T4 time)

Fig. a (Overlapping the Echo of the DIS signal and DCS signal)

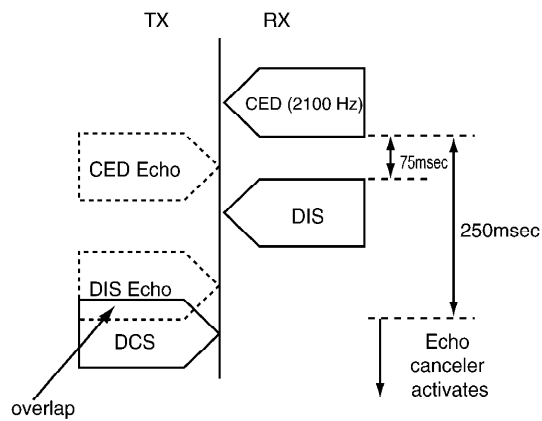


Fig. b (Countermeasure by Changing the CED Frequency)

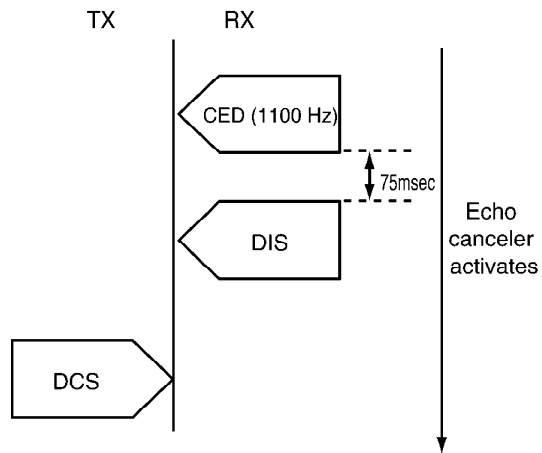


Fig. c (Countermeasure by Changing the Interval Between CED and DIS)

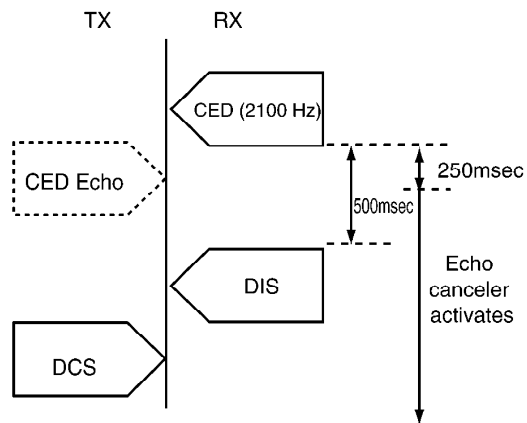
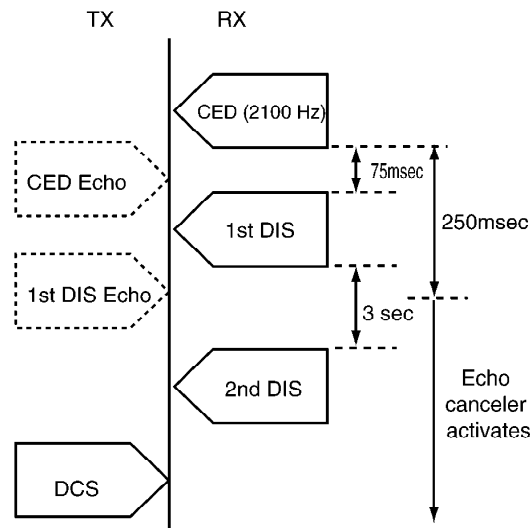
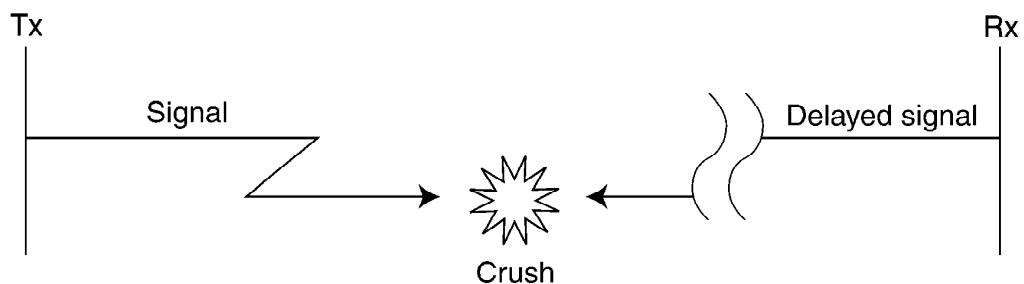


Fig. d (Countermeasure by Ignoring the 1st DIS)



<TX side signal>	<RX side signal>	<Countermeasure>
2nd / 3rd DCS / Training	& delayed CFR / FTT	at TX side
2nd / 3rd EOP / EOM / MPS	& delayed MCF / PIP / PIN / RTP / RTN	at TX side
delayed DCS	& 2nd / 3rd / --- DIS	at RX side

(Fig. e)



2.3.5.1.6. THE UNIT CAN COPY, BUT THE TRANSMISSION AND RECEPTION IMAGE ARE INCORRECT

(Long distance or international communication operation)

This symptom highly depends on the transmission and reception capability of the other FAX unit and the line conditions.

The countermeasures for this unit are shown below.

Transmission Operation:

Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

Reception Operation:

If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

- Refer to **SERVICE FUNCTION TABLE()**.

2.3.5.1.7. HOW TO RECORD FAX SIGNAL BY USING PC

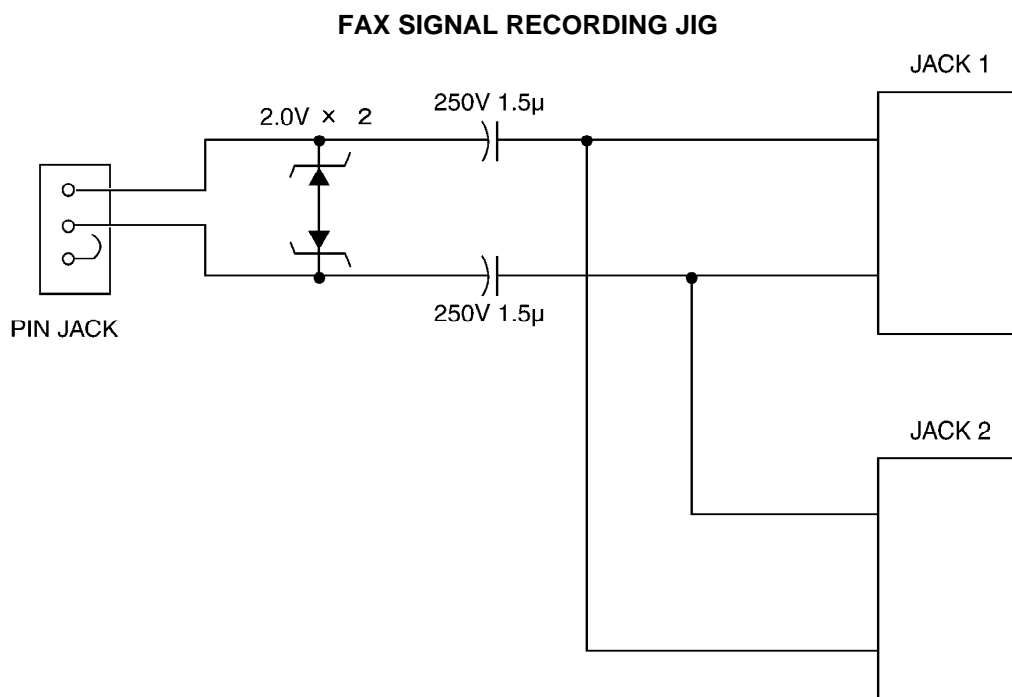
Recording FAX signal is one of the useful analysis measures to solve communication problems. The way of recording easily by using PC is shown as follows.

1. Equipment

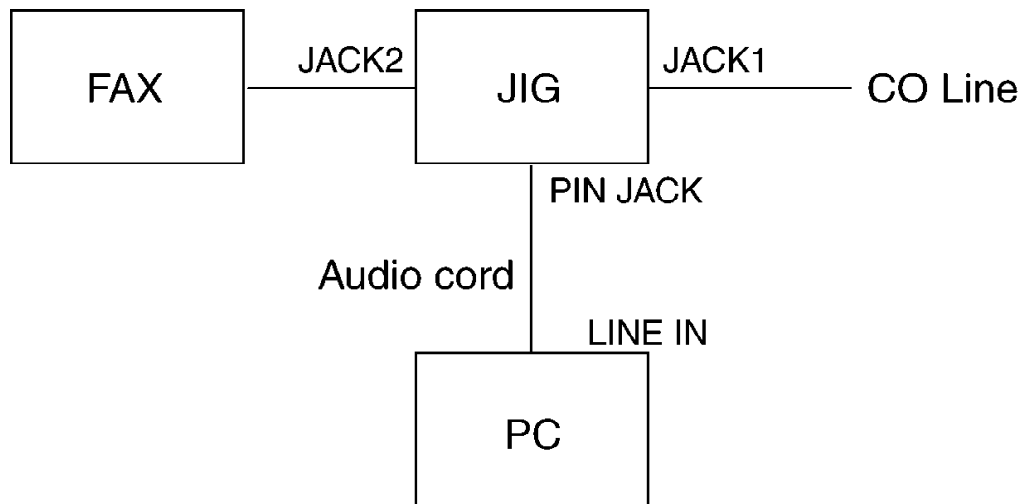
- 1 jig
- 1 PC (with LINE IN)
- 1 audio cord (mini jack supported)
- 2 tel cords

Parts No.	Parts Name & Description	Qt'y
PQJJ1T004Z	JACK1, JACK2	2
PQJJ1D010Z	PIN JACK	1
ECQE2155KF or ECQE2E155KC	CAPACITOR	2
MA4020	DIODE	2

2. Setting up



3. Connecting PC and JIG



4. PC setting and recording

1. Set LINE IN to be valid in the volume control setting.
Refer to the PC instruction book.
2. Start up the PC software “ SOUND RECORDER”. (This software is bundled to Windows OS, which can create WAV file.)
Set the audio format “ PCM 22.050kHz, 8bit, mono”.
3. Click the record button and start recording after acquisition the signal.

Note:

- Not to be wind wave patterns on the wave monitor.
- Please compress the recording data when you send attaching to E-Mail because the data size will be so heavy.
- Any software which can create WAV files is available.

2.3.5.1.8. HOW TO OUTPUT THE JOURNAL REPORT

1. Press three times.
2. Press **SET** .
3. Press **◀** or **▶** until the “ JOURNAL REPORT ” is displayed.
4. The report is printed out.

JOURNAL							Jan.19 2002 20:23
NO.	OTHER FACSIMILE	START TIME	USAGE TIME	MODE	PAGES	RESULT	*CODE
01	11	Jan. 01.00:02	00'48	RCV	01	COMMUNICATION ERROR	(43)

(3)
SND: Sent directly.
RCV: Received directly

(2) Communication message

(1) Error code

Error code table:

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	C n
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	SND	The document paper is jammed.	
	NO DOCUMENT	SND	No document paper.	
	PRINTER OVERHEATED	RCV	The thermal head is overheated.	
	PAPER OUT	RCV	Out of thermal paper or the cover is open.	
40	OTHER FAX NOT RESPOND	SND	Transmission is stopped when the T1 TIMER expires.	
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.	
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BPS training signal.	
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.	
44	COMMUNICATION ERROR	SND	RTN and PIN are received.	
46	COMMUNICATION ERROR	SND	No response after FTT is transmitted.	
48	COMMUNICATION ERROR	SND	No post message.	
49	COMMUNICATION ERROR	SND	RTN is transmitted.	
50	COMMUNICATION ERROR	SND	PIN is transmitted (to PRI-Q).	
51	COMMUNICATION ERROR	SND	PIN is transmitted.	
52	OTHER FAX NOT RESPOND	SND	Reception is finished when the T1 TIMER expires.	
53	ERROR-NOT YOUR UNIT	RCV	DCN is received after transmission of NSC and DTC.	
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after transmission of NSC .	
57	COMMUNICATION ERROR	SND	300bps error	
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.	

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	C n
59	ERROR-NOT YOUR UNIT	SND	DCN responds to a post message.	
64	COMMUNICATION ERROR	SND	Polling is not possible.	
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR is transmitted.	
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.	
72	COMMUNICATION ERROR	RCV	The carrier is cut when the image signal is received.	
FF	COMMUNICATION ERROR	SND & RCV	Modem error.	

SND=TRANSMISSION RCV=RECEPTION

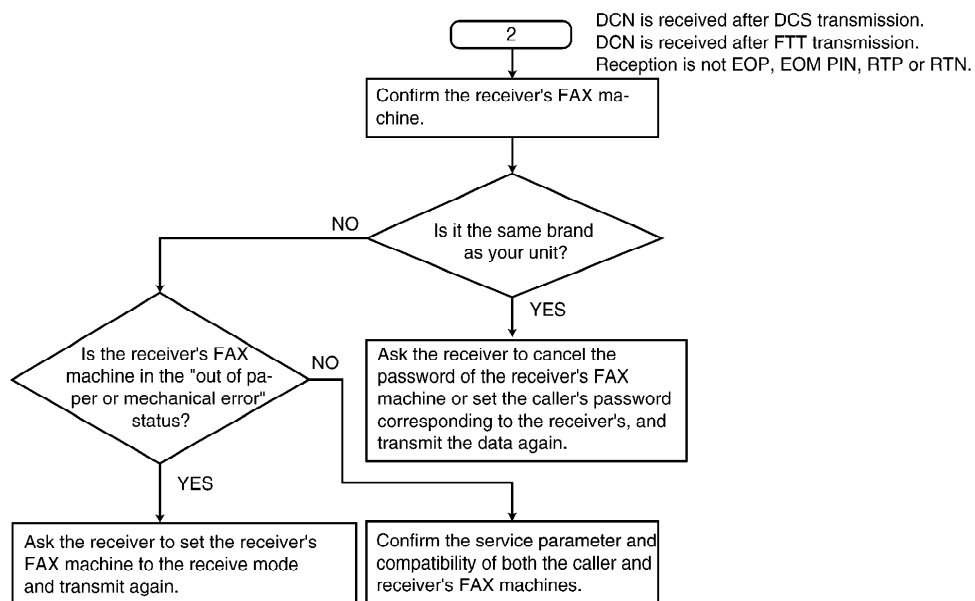
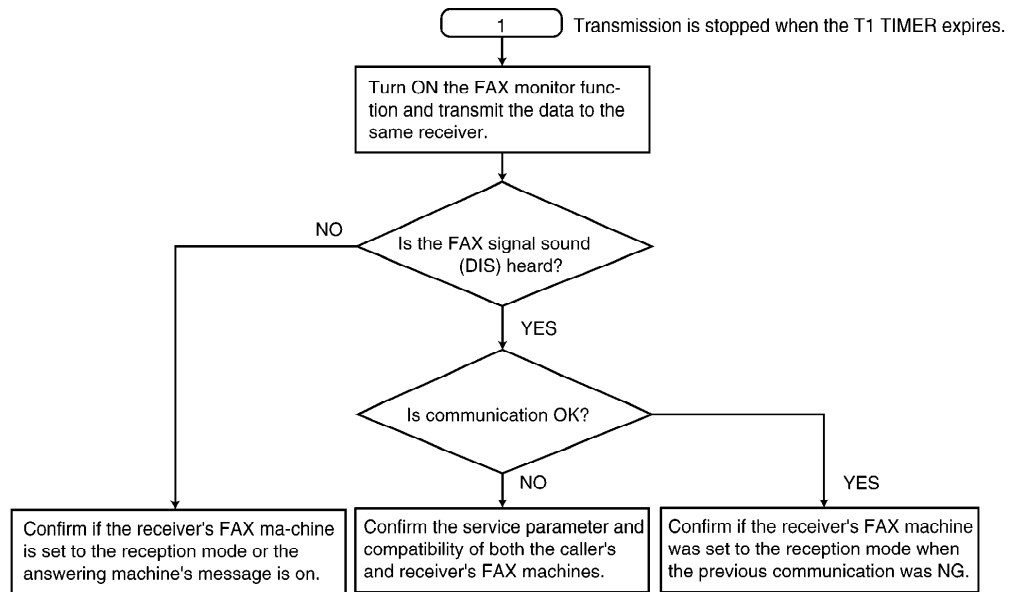
Most fax communication problems can be resolved by the following steps.

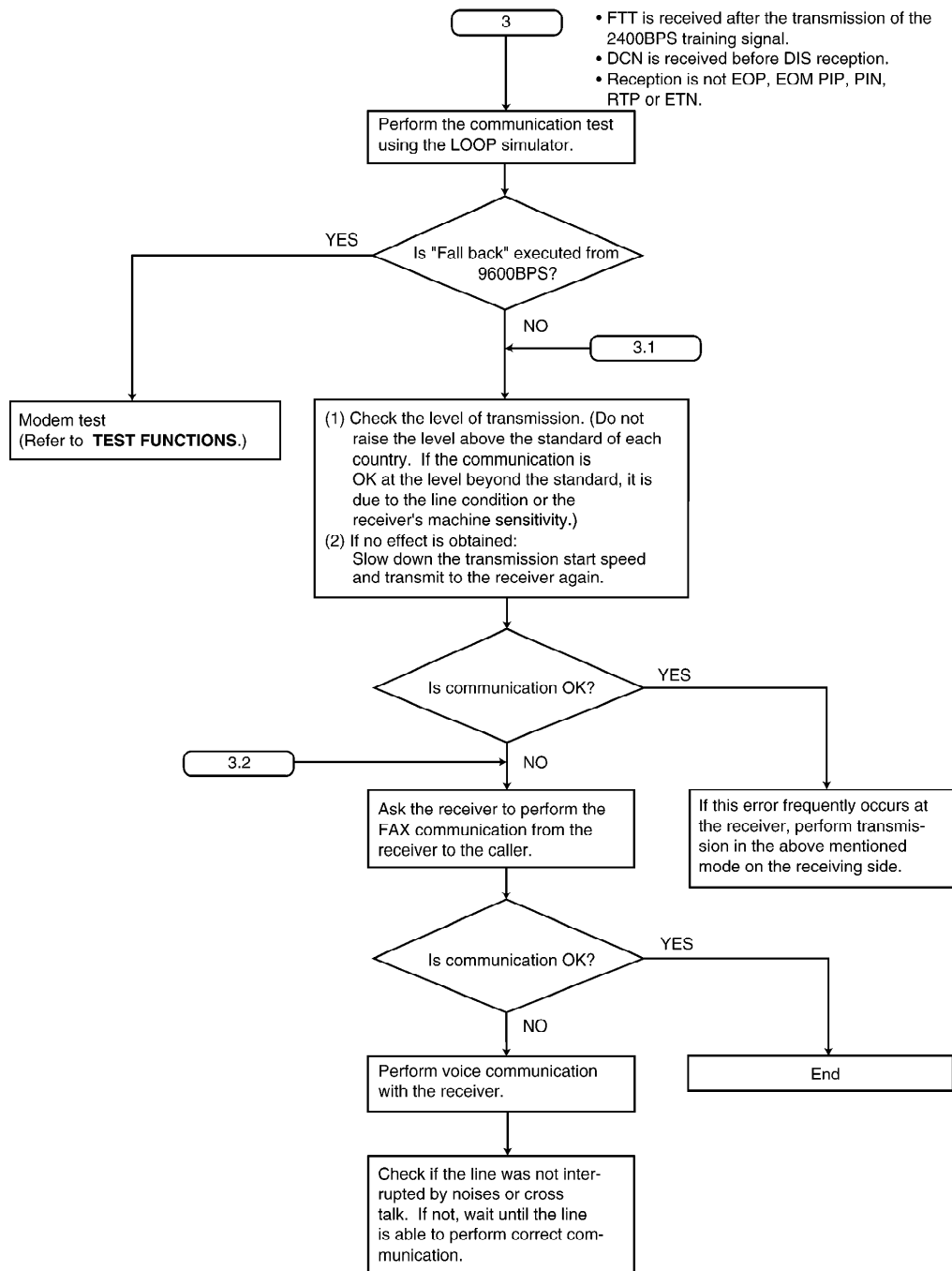
1. Change the transmit level. (Service code: 596, refer to **SERVICE FUNCTION TABLE()**.)
2. Change the TX speed/RX speed. (Service code: 717/718, refer to **SERVICE FUNCTION TABLE ()**.)

Note*:

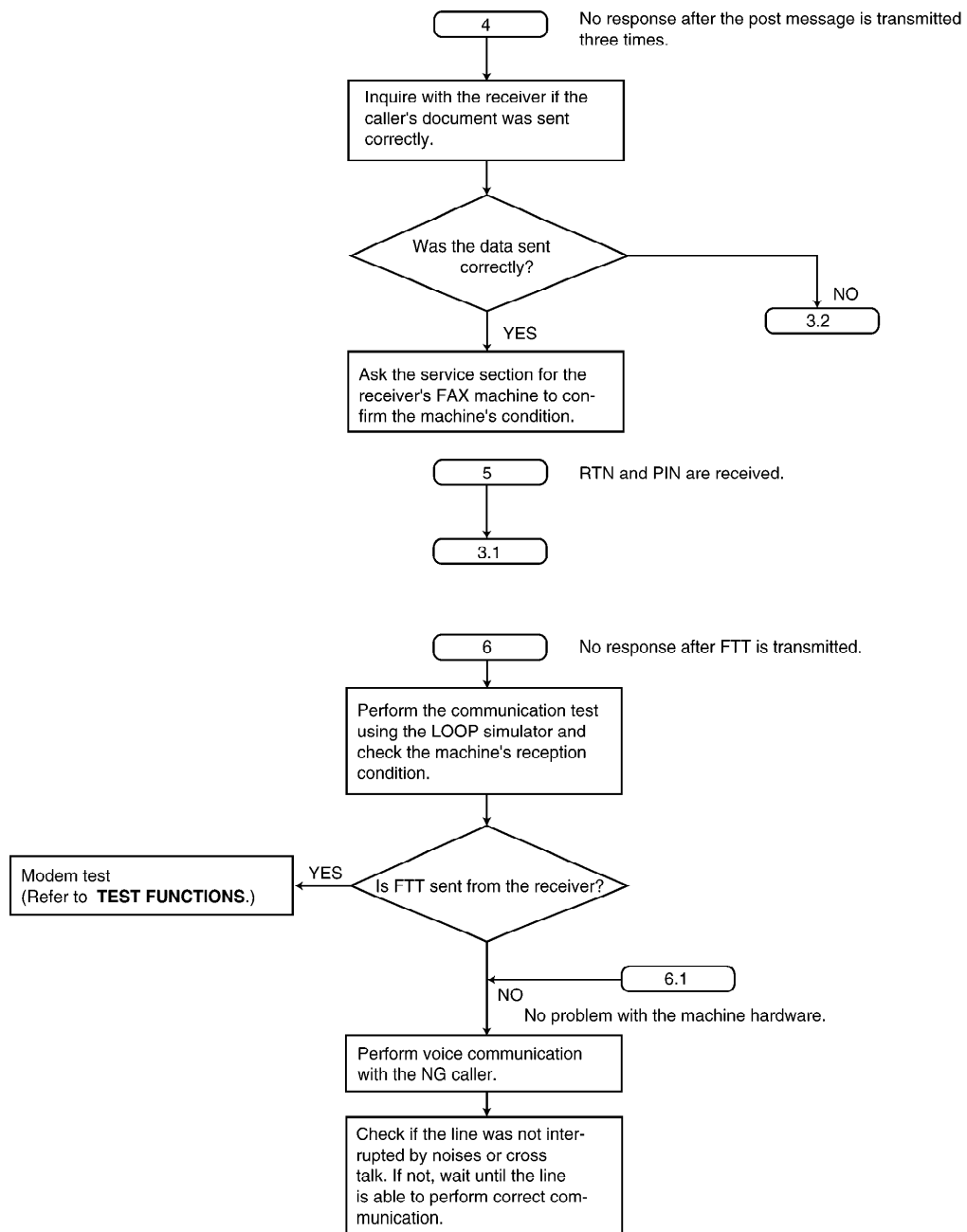
If the problem remains, see the following "Countermeasure" flow chart.

Countermeasure

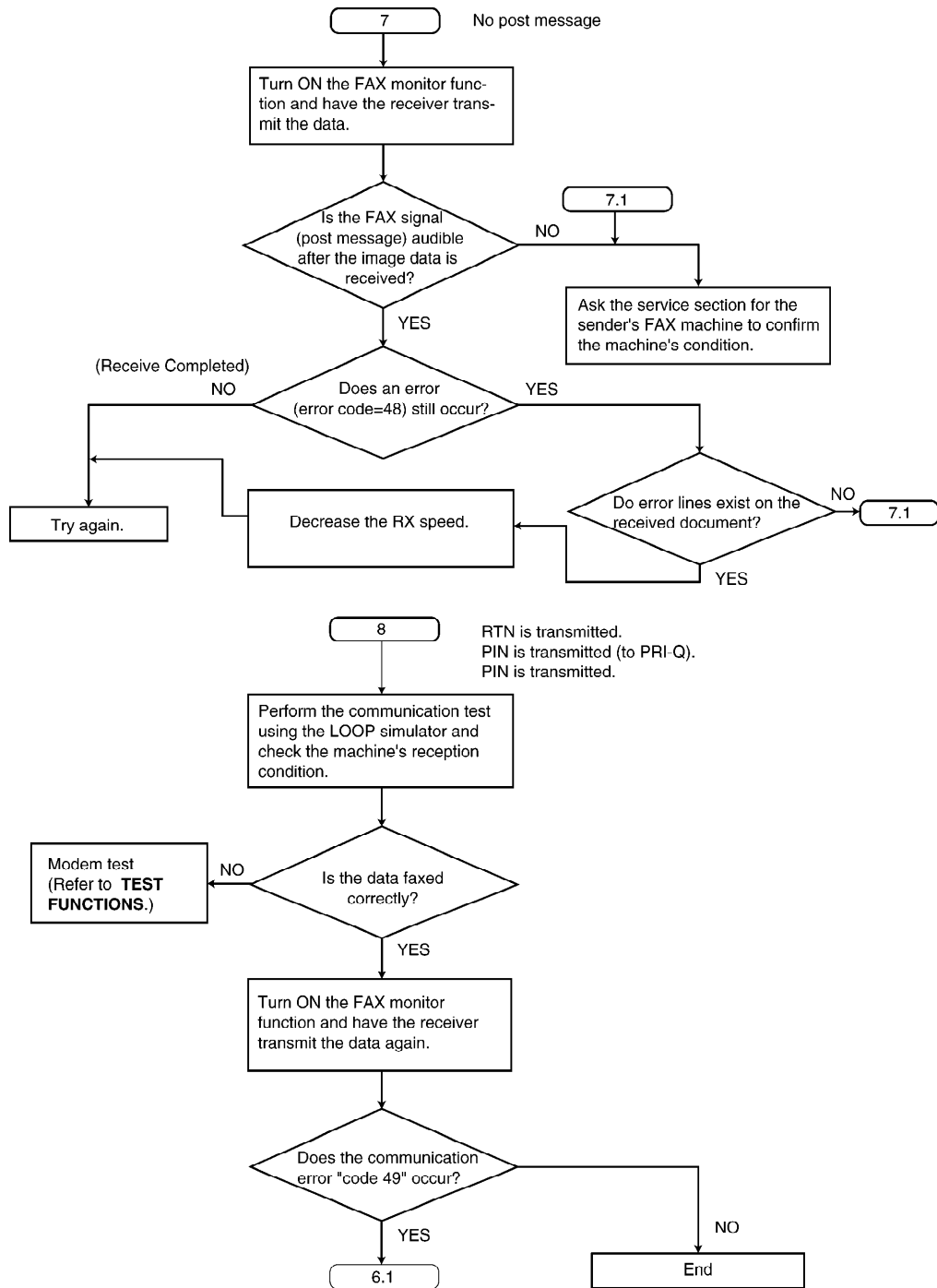




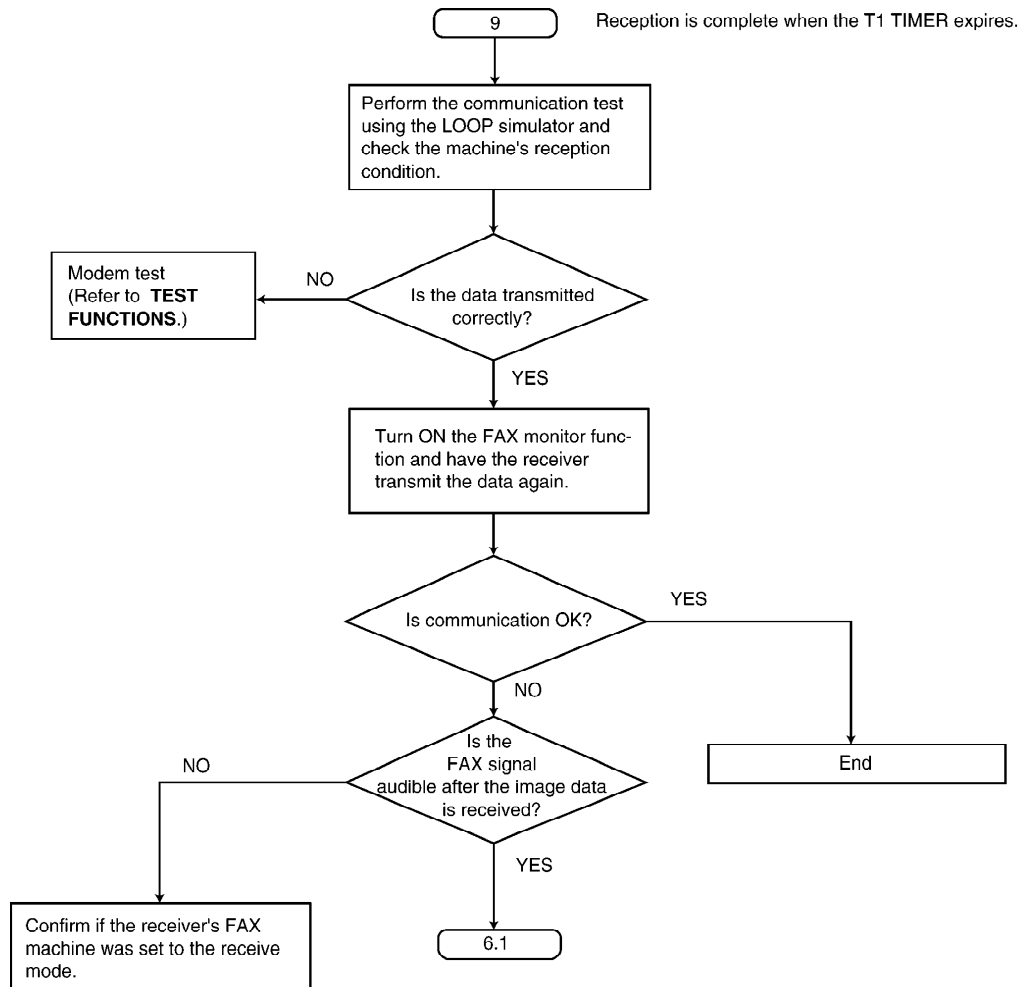
CROSS REFERENCE:
TEST FUNCTIONS()



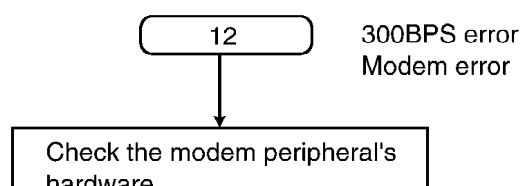
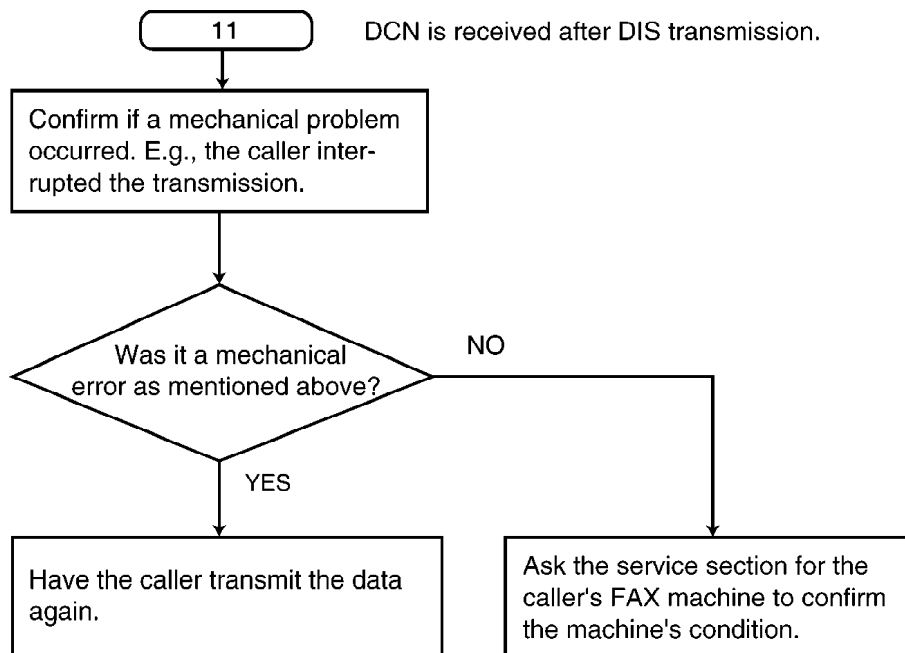
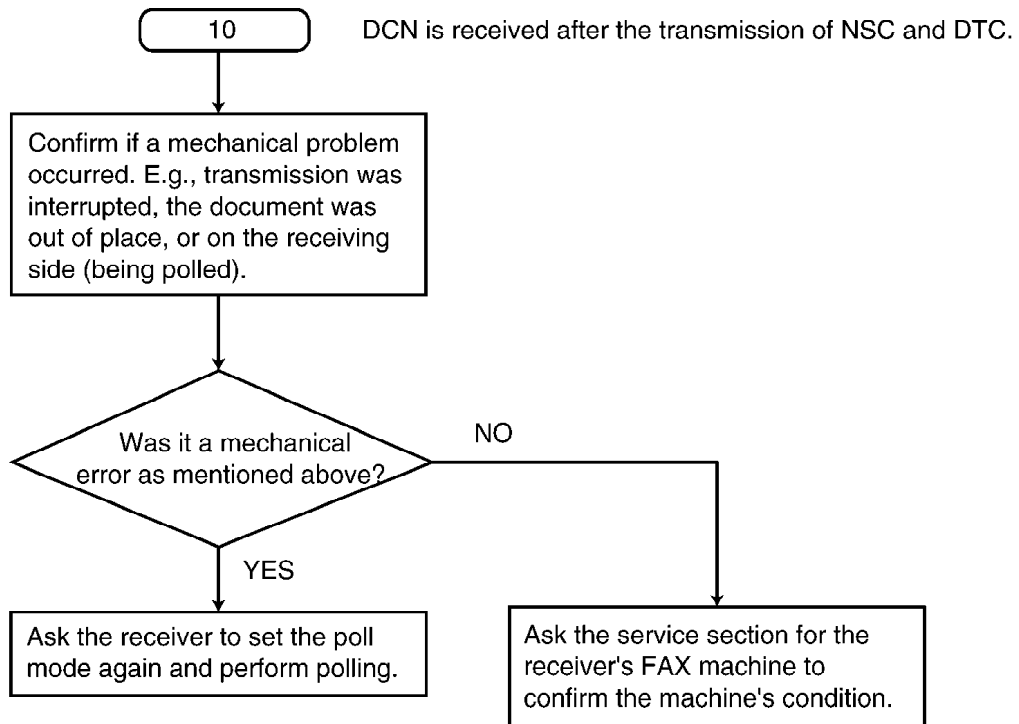
CROSS REFERENCE:
TEST FUNCTIONS()



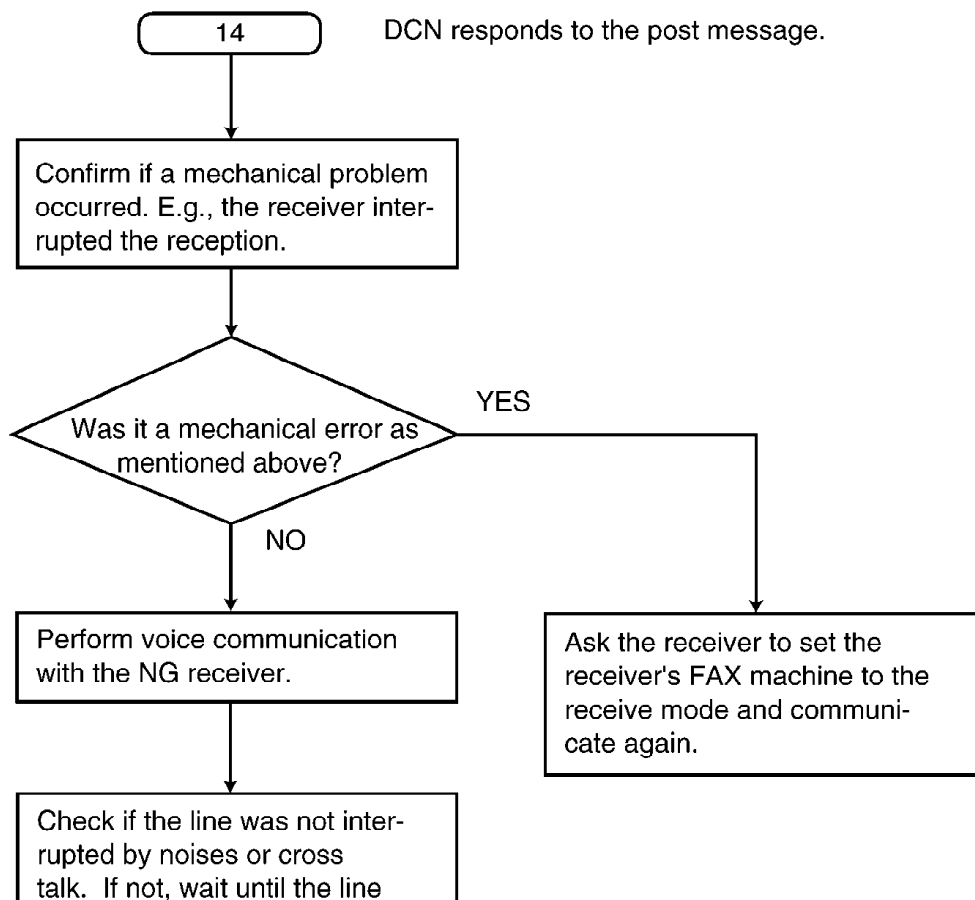
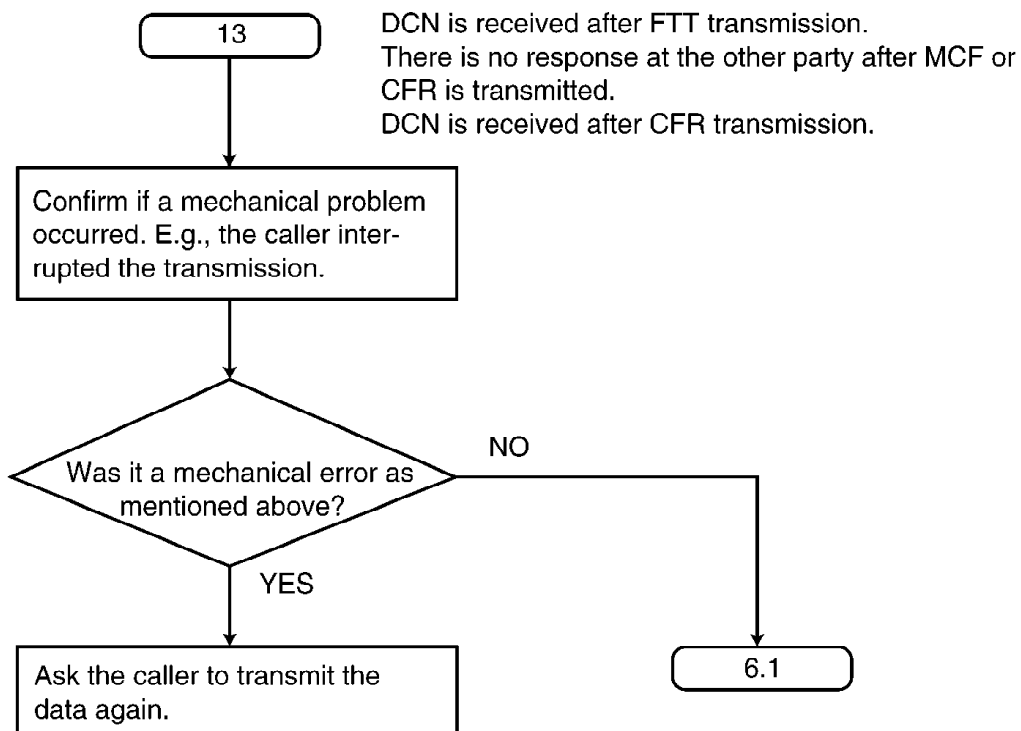
CROSS REFERENCE:
TEST FUNCTIONS()

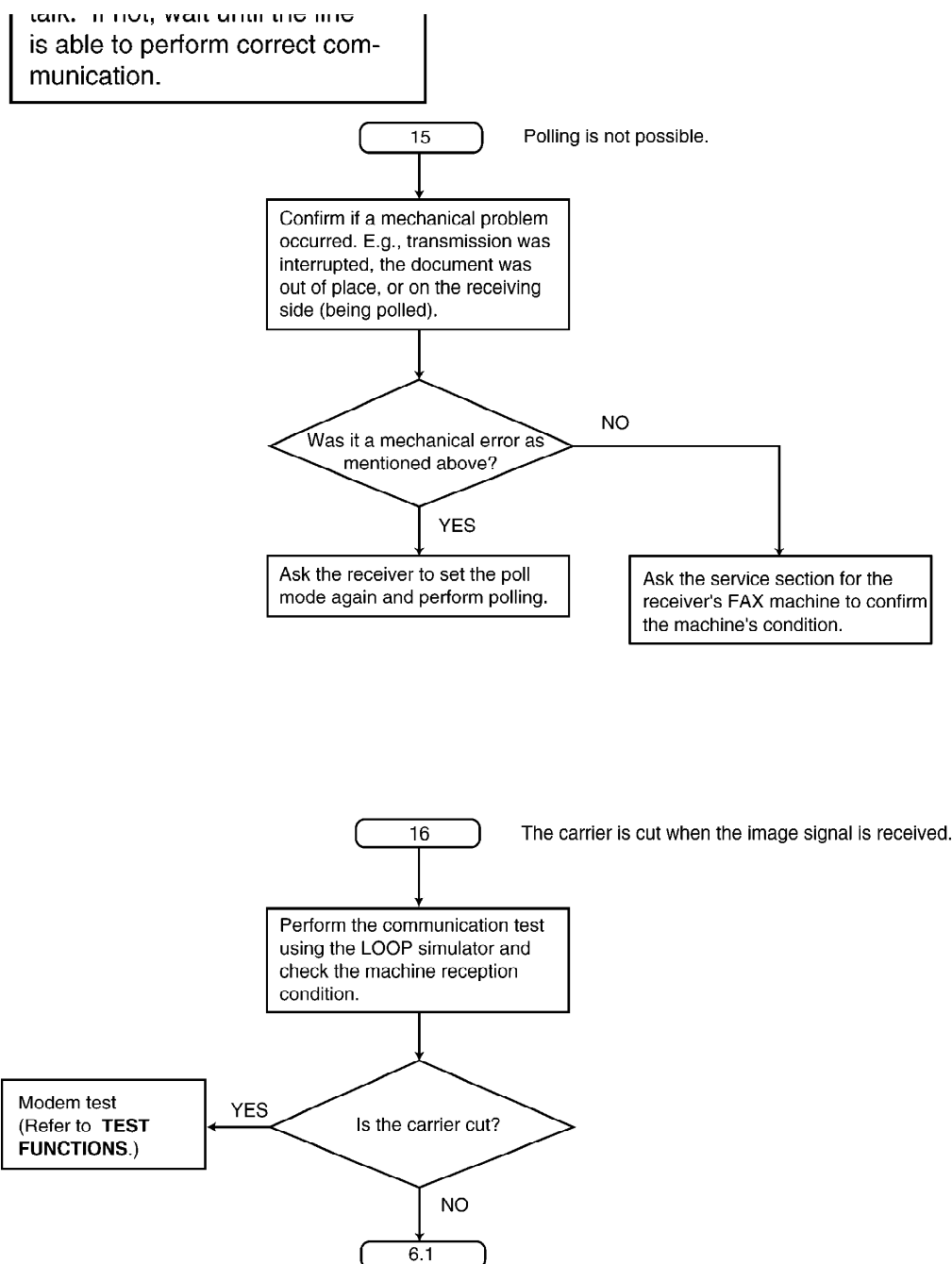


CROSS REFERENCE:
TEST FUNCTIONS()



hardware.





CROSS REFERENCE:
TEST FUNCTIONS()

2.3.5.2. REMOTE PROGRAMMING

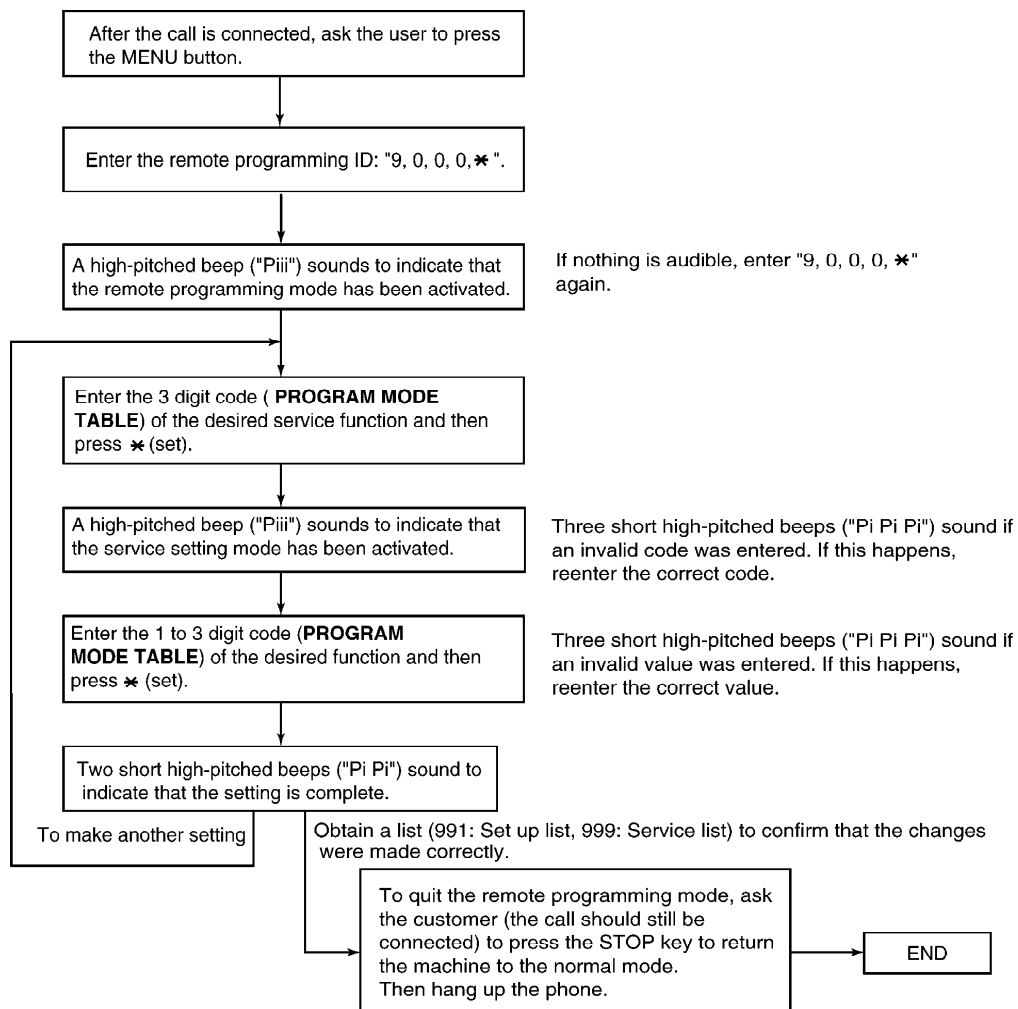
If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (Refer to **PROGRAM MODE TABLE ()**). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, out put the setup list (code: 991) and service list (code: 999) from the customer's fax machine. Based on this, the parameters for the desired codes can be changed. The procedure for changing and listing parameters is described on [ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES \(\)](#). Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that only the desired parameters were changed.

Hint:

Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone (except for a digital speakerphone). This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

2.3.5.2.1. ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES



CROSS REFERENCE:

[PROGRAM MODE TABLE \(\)](#)

2.3.5.2.2. PROGRAM MODE TABLE

Code	Function	Set Value	Default	F
001	Set the date and time	mm/dd/yy hh:mm	-----	
002	Your logo	-----	-----	
003	Your fax number	-----	-----	
004	Print transmission report	1:ERROR / 2:ON / 3:OFF	ERROR	
005	Auto answer mode	1:FAX ONLY / 2:TEL/FAX	FAX ONLY	
007	FAX ring count	2 to 9 rings	2 ring	
009	TEL/FAX delayed ring	2 to 9 rings	2 ring	
013	Dialing mode	1:TONE / 2:PULSE	TONE	
022	Journal auto print	1:ON / 2:OFF	ON	
023	Overseas mode	1:ON / 2:OFF	OFF	
025	Delayed send	1:ON / 2:OFF	OFF	
030	Silent FAX recognition ring	3 to 9 rings	3 rings	
031	Ring detection	1:OFF / 2:A / 3:B / 4:C / 5:D	OFF	
041	FAX activation code	ON/OFF	ON/ID=*9	
046	Friendly reception	1:ON / 2:OFF	ON	
049	Auto disconnect	ON/OFF	ON/ID=*0	
058	Original setting	1:NORMAL / 2 :LIGHT / 3: DARKER	NORMAL	
070	FAX pager call	ON/OFF	OFF	
076	Connecting tone	1:ON / 2:OFF	ON	
080	Set the default	YES/NO	NO	
501	Pause time set	001~600 X 100 msec	050	
502	Flash time set	01~99 X 10 msec	10	
503	Dial speed set	1:10pps / 2:20 pps	10	
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	
521	International mode select	1:ON / 2:OFF	ON	
522	Auto standby select	1:ON / 2:OFF	ON	
523	Receive equalizer select	1:ON / 2:OFF	OFF	
524	SND EQL.	1:ON / 2:OFF	OFF	
531	Release PIN code for DIAL LOCK	1:ON / 2:NO	NO	
544	Document feed position adjustment value set	01~99 step	50	
550	Memory clear	Press "START".	-----	
551	ROM check	Press "START".	-----	
553	Monitor on FAX communication select	1:OFF 2:P-B 3:ALL	OFF	
554	Modem test	Press "START".	-----	
555	Scanner test	Press "START".	-----	
556	Motor test	Press "START".	-----	
557	LED test	Press "START".	-----	
558	LCD test	Press "START".	-----	

Code	Function	Set Value	Default	F
559	Document jam detection select	1:ON / 2:OFF	ON	
561	Key test	Press any key.	-----	
570	Break % select	1:61% / 2:67%	67%	
571	ITS auto redial time set	00~99	05	
572	ITS auto redial line disconnection time set	001~999 set	065	
573	Remote turn-on ring number set	01~99	10	
590	FAX auto redial time set	00~99	05	
591	FAX auto redial line disconnection time set	001~999	065	
592	CNG transmit select	1:OFF/2:ALL/3:AUTO	ALL	
593	Time between CED and 300 bps	1:75/2:500/3:1s	75 ms	
594	Overseas DIS detection select	1:1st/2:2nd	1st	
595	Receive error limit value set	001~999	100	
596	Transmit level set	-15~00dBm	-11	
598	Receiving Sensitivity	20~48	45	
717	Transmit speed select	1:9600/2:7200/3:4800/4:2400bps	9600bps	
718	Receive speed select	1:9600/2:7200/3:4800/4:2400bps	9600bps	
719	Ringer off in TEL/FAX mode	1:ON/2:OFF	ON	
721	Pause tone detect	1:ON/2:OFF	ON	
722	Redial tone detect	1:ON/2:OFF	ON	
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	
771	T1 timer	1:35 sec/2:60 sec	35 sec	
774	T4 timer	00~99 X 100ms	00	
815	Sensor check	Press "START".	-----	
844	Original setting	1: NORMAL/2:LIGHT/3:DARKER	NORMAL	
991	Transmit basic list	1: START	-----	
992	Transmit advanced list	1: START	-----	
994	Transmit journal report	1: START	-----	
996	Journal 3	1: START	-----	
999	Transmit service list	1: START	-----	

OK : Can set the value by the remote programming feature or print a list.

NG : Cannot set the value.

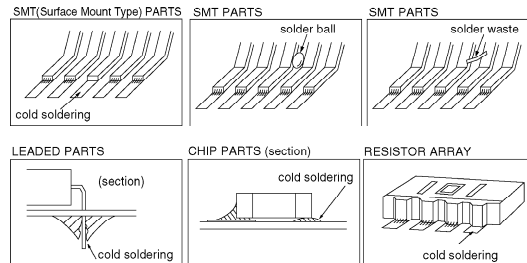
Note:

Note: Refer to **SERVICE FUNCTION TABLE** () for descriptions of the individual codes.

For example, the "004 Transmission report mode" set value "1:ERROR/2:ON/3:OFF" number corresponds to the number dialled.

2.3.6. DIGITAL BOARD SECTION

One of most difficult problems to deal with is when the system will not boot up.
The symptom: No response when the power is turned on. (No LCD display, keys are not accepted.)



Note:

1. Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.
2. Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.

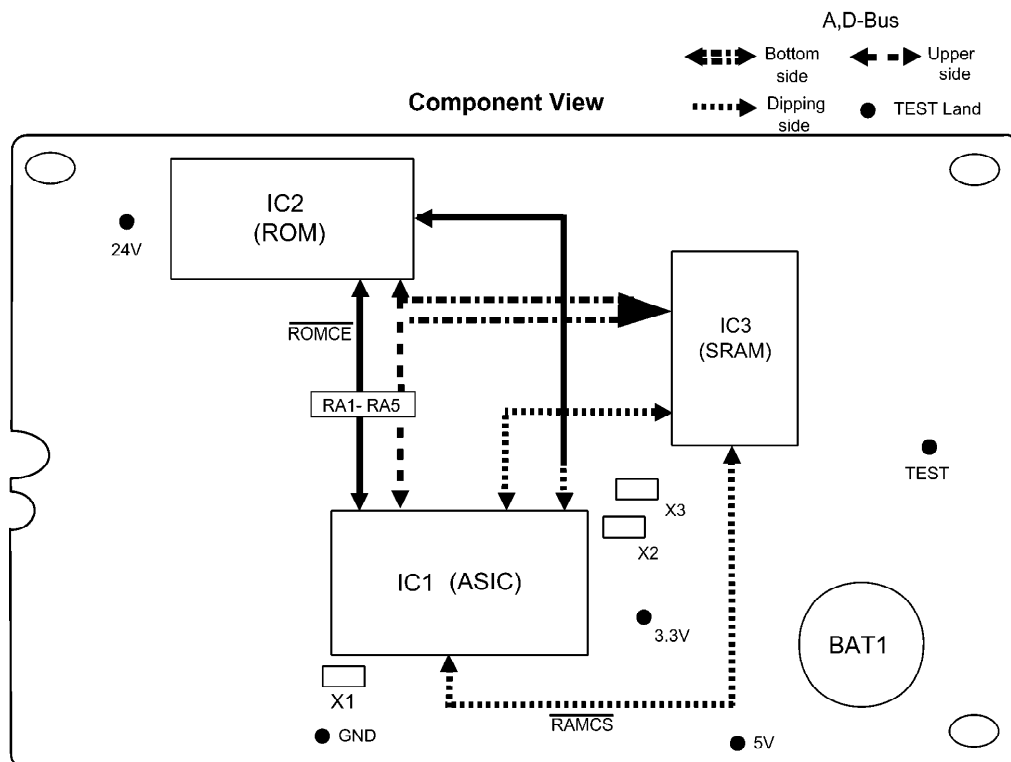
Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially SRAM and ROM) malfunctions are extremely rare after installation in the product.) / This may be repaired by replacing the IC, (ASIC etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead. / Soldering faults which are difficult to detect with the naked eye are common, particularly for an ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines. / Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved. / An explanation of the main signals (for booting up the unit) is below.

Don't replace ICs or stop repairing until checking the signal lines.
An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?

Please refer to the **DIGITAL BLOCK DIAGRAM** (). / The ASIC (including the CPU) (IC1) controls all the other digital ICs. When the power is turned on, the ASIC (CPU) retrieves the operation code stored in the ROM (IC2), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address. / It is the address bus by which the ASIC (CPU) designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC (CPU) to the ICs. / These signal lines are all controlled by voltages of 5V (H) / 3.3V (H) or 0V (L).

2.3.6.1. DIGITAL BLOCK DIAGRAM



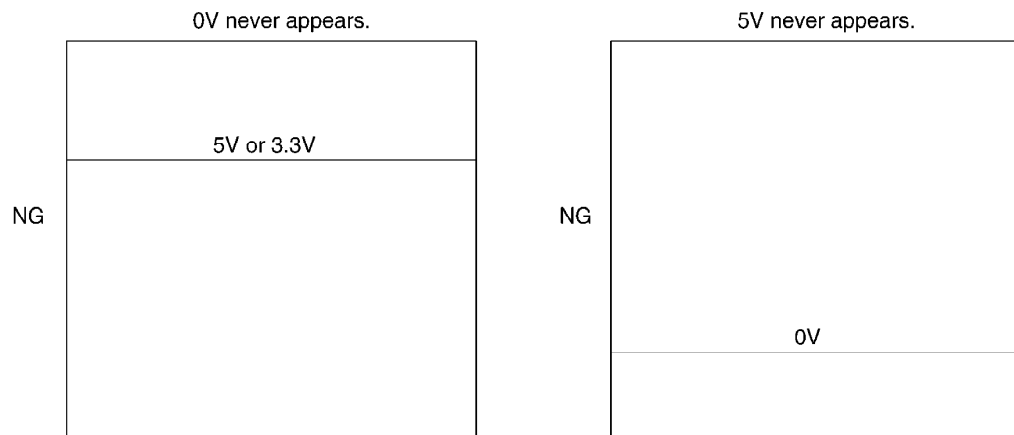
The signal lines that must be normal for the system to boot up are listed here [List 1]. / For signal lines other than these, even if they malfunction they do not directly affect booting up the system.

[List 1]

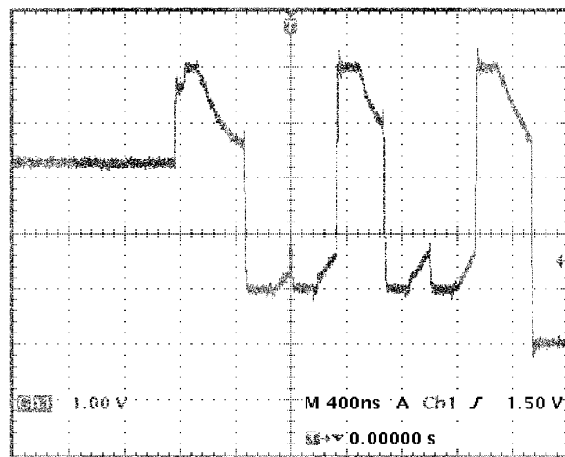
(1)	D0-D7	(Data Bus)
(2)	A0-A16	(Address Bus)
(3)	\overline{RD}	(Read Signal)
(4)	\overline{WR}	(Write Signal)
(5)	\overline{ROMCS}	(ROM Select Signal)
(6)	\overline{RAMCS}	(SRAM Select Signal)

If these signals are normal, once the power is turned on, each IC repeatedly outputs 5V or 3.3V (H) and 0V (L). The following page shows NG and normal wave patterns.

NG Wave pattern (Refer to NG EXAMPLE)



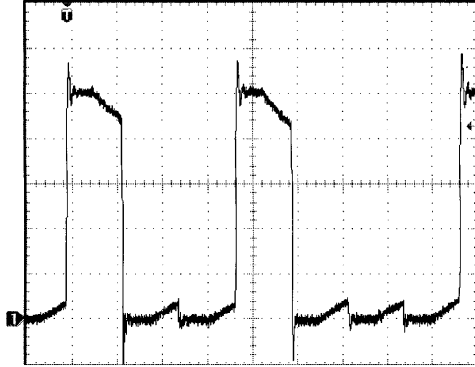
For a short between D0 and D1



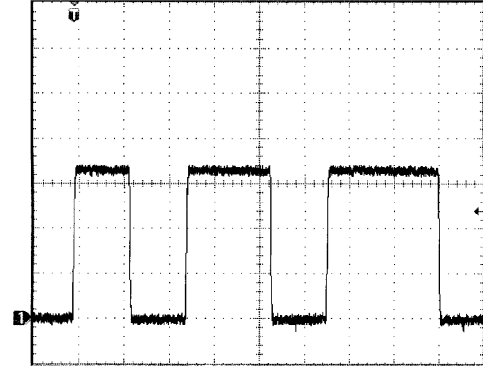
Normal Wave Patterns

OK

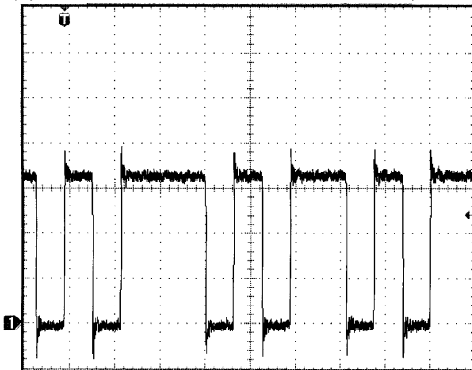
(1) D0~D7 200ns/div, 1v/div



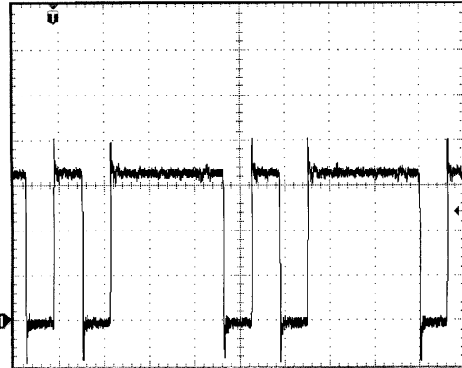
(2) A0~A17 200ns/div, 1v/div



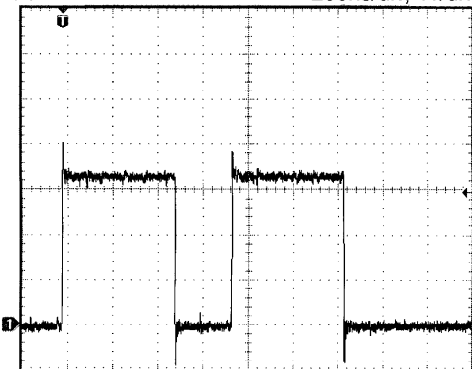
(3) \overline{RD} 200ns/div, 1v/div



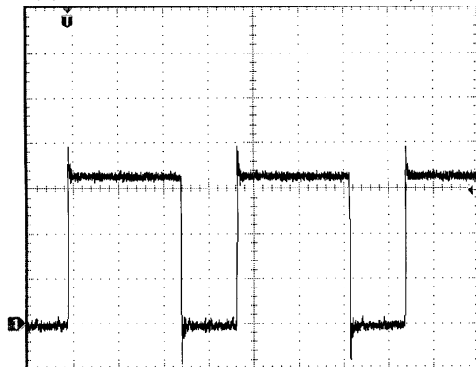
(4) \overline{WR} 200ns/div, 1v/div



(5) \overline{ROMCS} 200ns/div, 1v/div



(6) \overline{RAMCS} 200ns/div, 1v/div



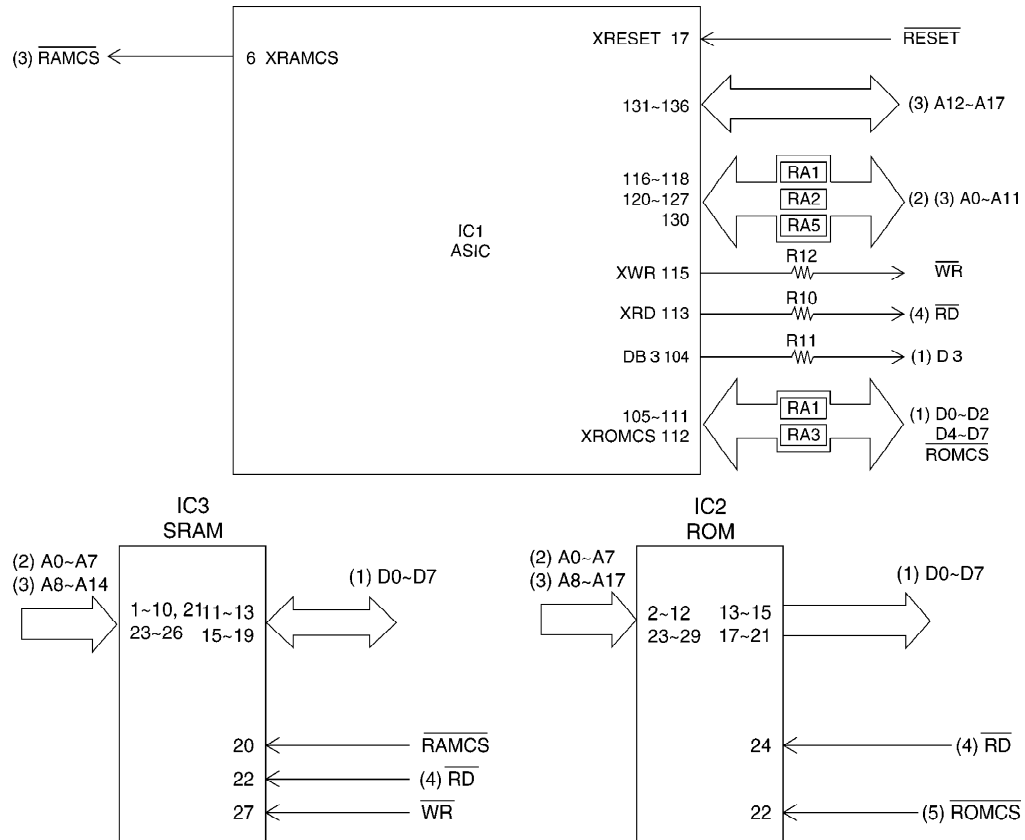
For these reasons and the software sequence to boot up the unit, if you use an oscilloscope to judge whether a signal is OK or NG, you must check in the same order as in [List 1]. (If the ASIC (CPU) failed to access the ROM, the ASIC cannot access the SRAM normally.)

The digital circuit actually operates according to the timing combinations of these signals. So, if the timing of these signals is even slightly off, the circuit will not operate normally. Even if the IC did malfunction, the output voltage level may become abnormal but the timing is accurate according to the specifications. (If oscillation is provided accurately.) / Accordingly, the problem

presented here is whether each IC outputs the correct signal. (See the I/O and Pin No. diagram.)
In other words, is it constantly switching between 5V or 3.3V (H) and 0V (L) as described earlier.

All you have to do is check that the IC repeatedly outputs (H) 5V or 3.3V and (L) 0V.

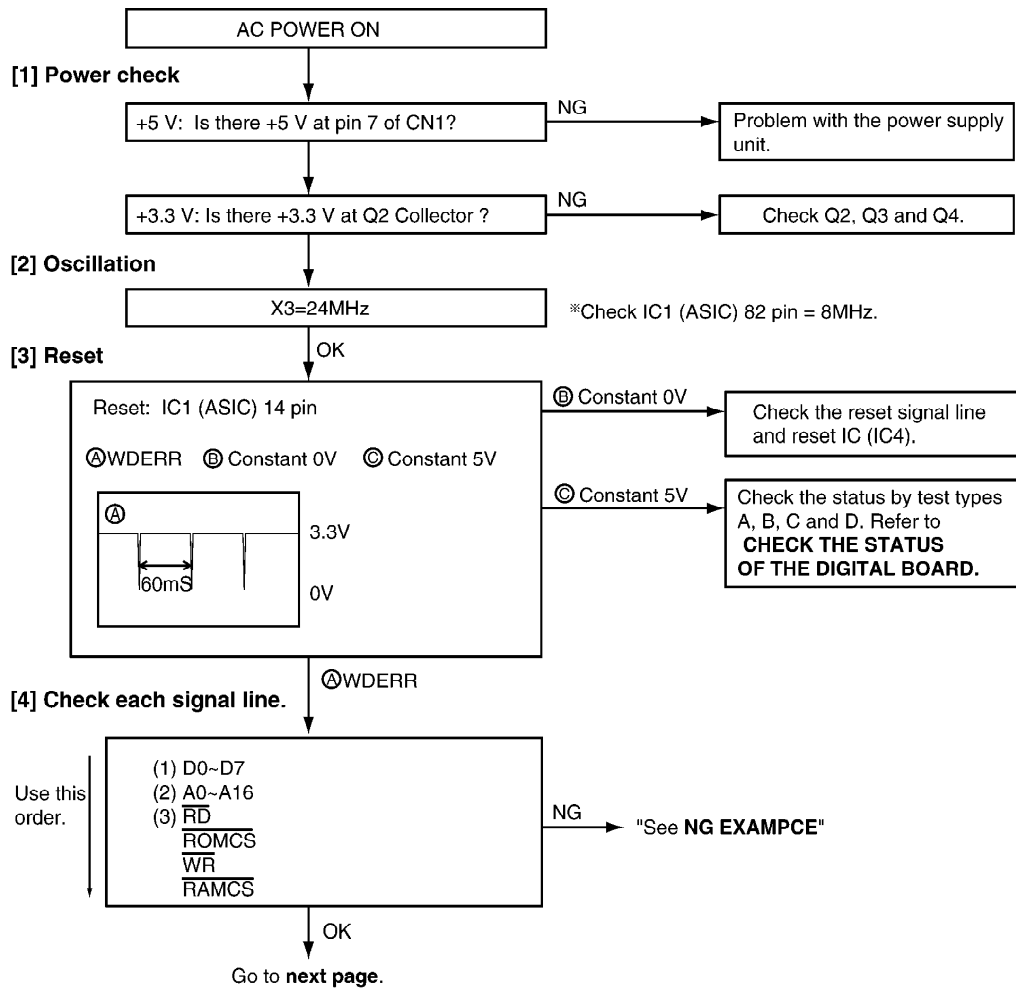
I/O and Pin No. Diagram



After the power is turned on, the ASIC (CPU) initializes and checks each IC.

The ROM and SRAM are checked.

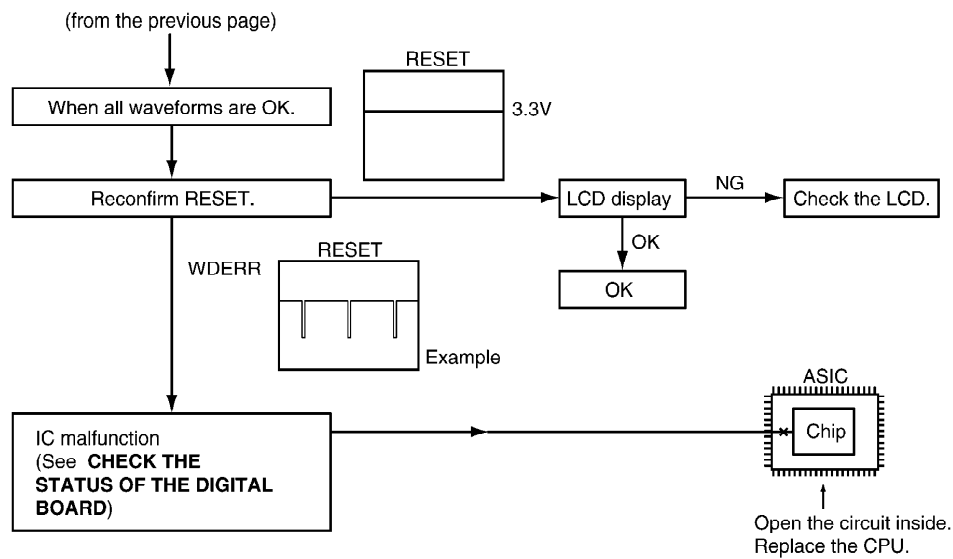
If initialization fails for the ICs, the system will not boot up.



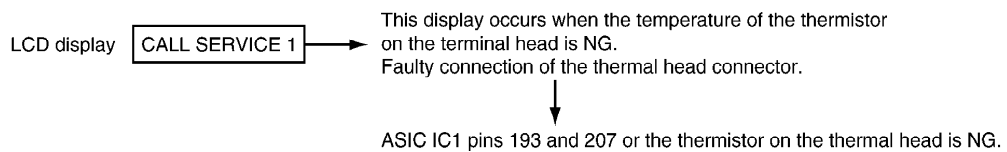
CROSS REFERENCE:

NG EXAMPLE ()

CHECK THE STATUS OF THE DIGITAL BOARD ()



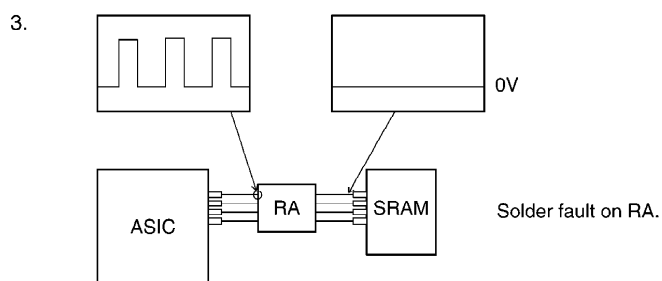
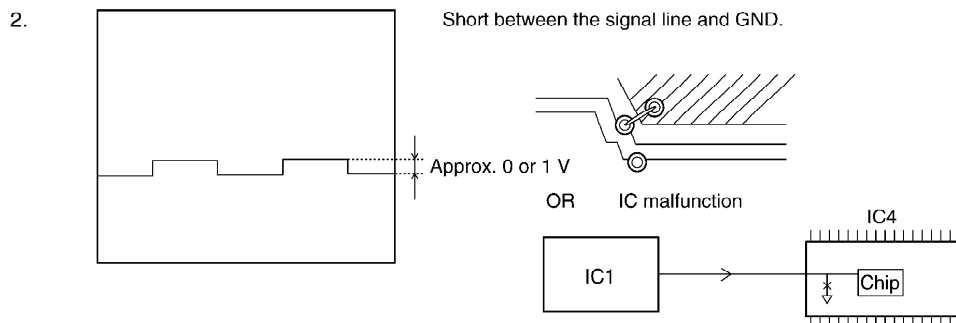
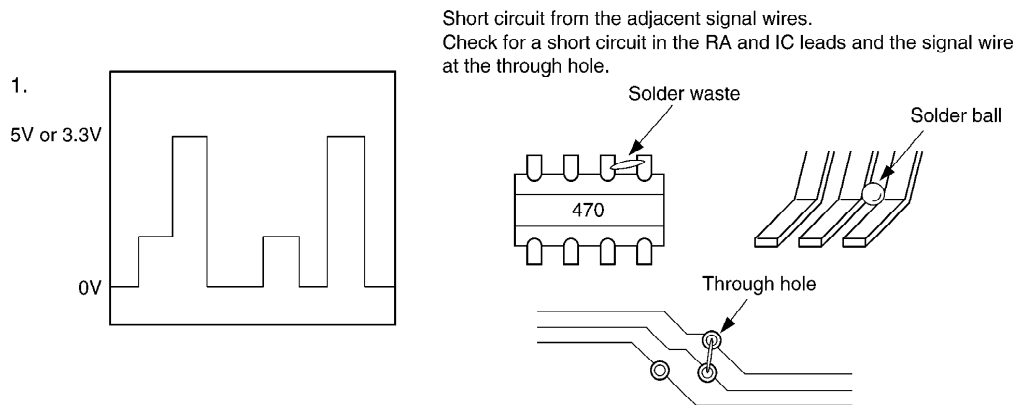
Other NG examples while the power is ON and the LCD displays the following.



CROSS REFERENCE:

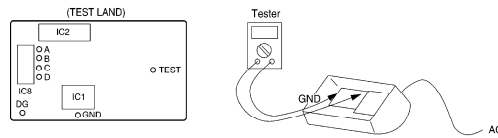
CHECK THE STATUS OF THE DIGITAL BOARD ()

2.3.6.2. NG EXAMPLE



2.3.6.3. CHECK THE STATUS OF THE DIGITAL BOARD

Put the unit in the test mode and check the voltage at lands A, B, C and D.



Turn off the power supply.
Short using a metallic object, such as tweezers, between the TEST and GND land, and turn on the AC power.
Check the following after turning on the power, using an oscilloscope or tester.
To cancel the status check mode, turn off the AC power.

Item	Check point voltage				Check points
	A	B	C	D	
CLOCK(IC1)	5V	0V	0V	0V	IC1
MODEM(IC1)	0V	5V	0V	0V	IC1
S-RAM(IC3)	0V	0V	5V	0V	IC3 (20 pin), IC1 (6 pin), IC3
ASIC(IC1)	0V	0V	0V	5V	RA1-RA5, R10, R12 and R11 IC1(104-136 pins)
ALL OK	5V	5V	0V	0V	

This indicates that the Add/Data Bus, RAM, ROM, MODEM, and ASIC are all completely connected to the CPU and that control from the CPU is possible.

Please check the soldering and conduction of these components.
If there is no problem, replace the ICs.

If you still have a problem with the digital board, Please see "checking details" (Refer to **NG wave pattern**).

To cancel the status check mode, turn off the AC power.

2.3.7. ANALOG BOARD SECTION

The analog parts check is actually different than the digital parts check. The signal route is determined by the purpose of the check. For example, the handset TX route begins from the handset microphone and is output in the telephone line. In this route, it is mainly an analog signal. Tracing the signal can be done easily using an oscilloscope. Each route is shown on the **CHECK SHEET** (here). If there is a problem with the unit (for example, you cannot communicate with the H/S, etc.), trace the signal in the area and determine the cause.

2.3.7.1. CHECK SHEET

(SYMPTOM) ITEMS TO CHECK		IN	signal	ROUTE	OUT
Monitor				TEL LINE-L1-R14-R12-T1-C23-R33-IC2(6-7)-CN1(10)-{CN9(10)-IC6(9-8)-C52-R42-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-C67-CN9(16)}-CN1(16)-R75-IC1(4-5, 8)-CN2-SPEAKER	
Handset Tx				MIC-L5-C54-R49-IC2(2, 3-1)-CN1(15)-{CN9(15)-R62-C66-R131-C60-R51-IC9(2-1)-CN9(11)}-L8-C53-R48-CN1(11)-C30-R31-T1-R12-R14-L1-TEL LINE	
Handset Rx				TEL LINE-L1-R14-R12-T1-C23-R33-IC2(6-7)-CN1(10)-{CN9(10)-IC6(9-8)-C52-R42-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-R60-C63-IC6(4-3)-C65-CN9(17)}-CN1(17)-R64-Q2(Base-Collector)-C47-CN3-HANDSET SPEAKER	
DTMF	Monitor			{IC5(3)-C48-R37-R38-IC8(6-7)-C54-R44-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-C67-CN9(16)}-CN1(16)-R75-IC1(4-5, 8)-CN2-SPEAKER	
	Handset			{IC5(3)-C48-R37-R38-IC8(6-7)-C54-R44-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-R60-C63-IC6(4-3)-C65-CN9(17)}-CN1(17)-R64-Q2(Base-Collector)-C47-CN3-SHANDSET SPEAKER	
DTMF TEL LINE FAX Tx DUMMY Ring Back Tone				{IC5(3)-C48-R37-R38-IC8(6-7)-C53-IC6(2-1)-C58-R49-IC9(2-1)-CN9(11)}-CN1(11)-C30-R31-T1-R12-R14-L1-TEL LINE	
Ringing/Alarm Beep/Keytone				{IC1(59)-R28-C45-R35-IC8(2-1)-C27-R13-IC1(62-63)-C62-R57-IC9(6-7)-C67-CN9(16)}-CN1(16)-R75-IC1(4-5, 8)-CN2-SPEAKER	
FAX Rx				TEL LINE-L1-R14-R12-T1-C23-R33-IC2(6-7)-CN1(10)-{CN9(10)-IC6(10-11)-R33-C43-IC5(15)}	
DTMF detection				TEL LINE-L2-RL1(3-5)(detection for Ext.TEL)-CN5-C11-R17-T1-C23-R33-IC2(6-7)-CN1(10)-{CN9(10)-IC6(10-11)-R33-C43-IC5(15)}	

Note:

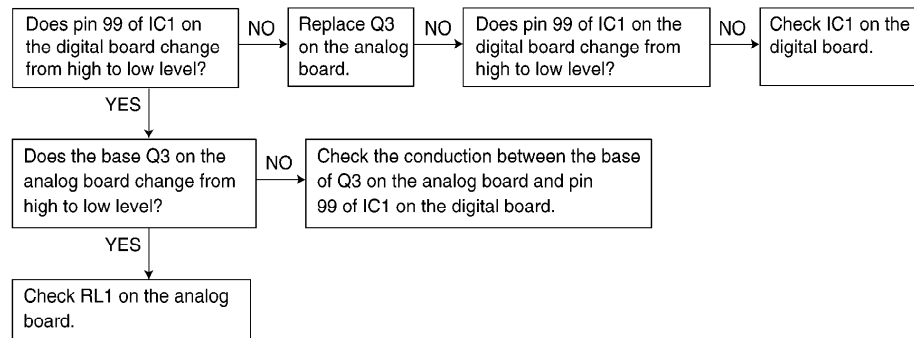
{ }: Inside the digital board /

2.3.7.2. DEFECTIVE ITS (INTEGRATED TELEPHONE SYSTEM) SECTION

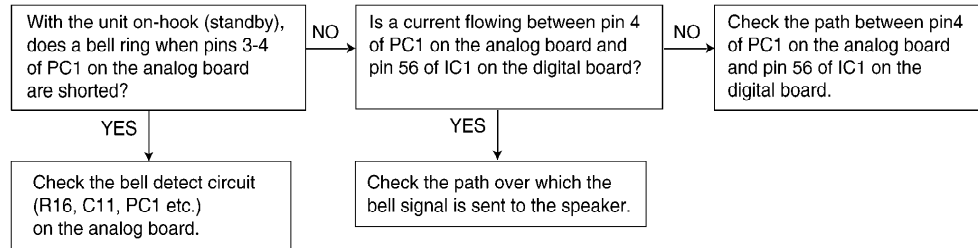
a. No handset and monitor transmission/reception

Following the ITS section or NCU section, search for the route between the microphone and the telephone line (sending) or between the telephone line and the speaker (receiving) where the signal disappears. Check the components at that point.

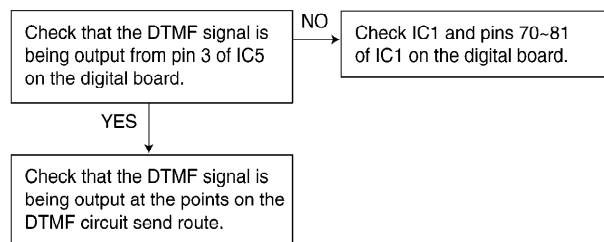
b. No pulse dialling



c. Not ring tone



d. No tone dialling



2.3.7.3. Power Supply Board Section

1. Key components for troubleshooting

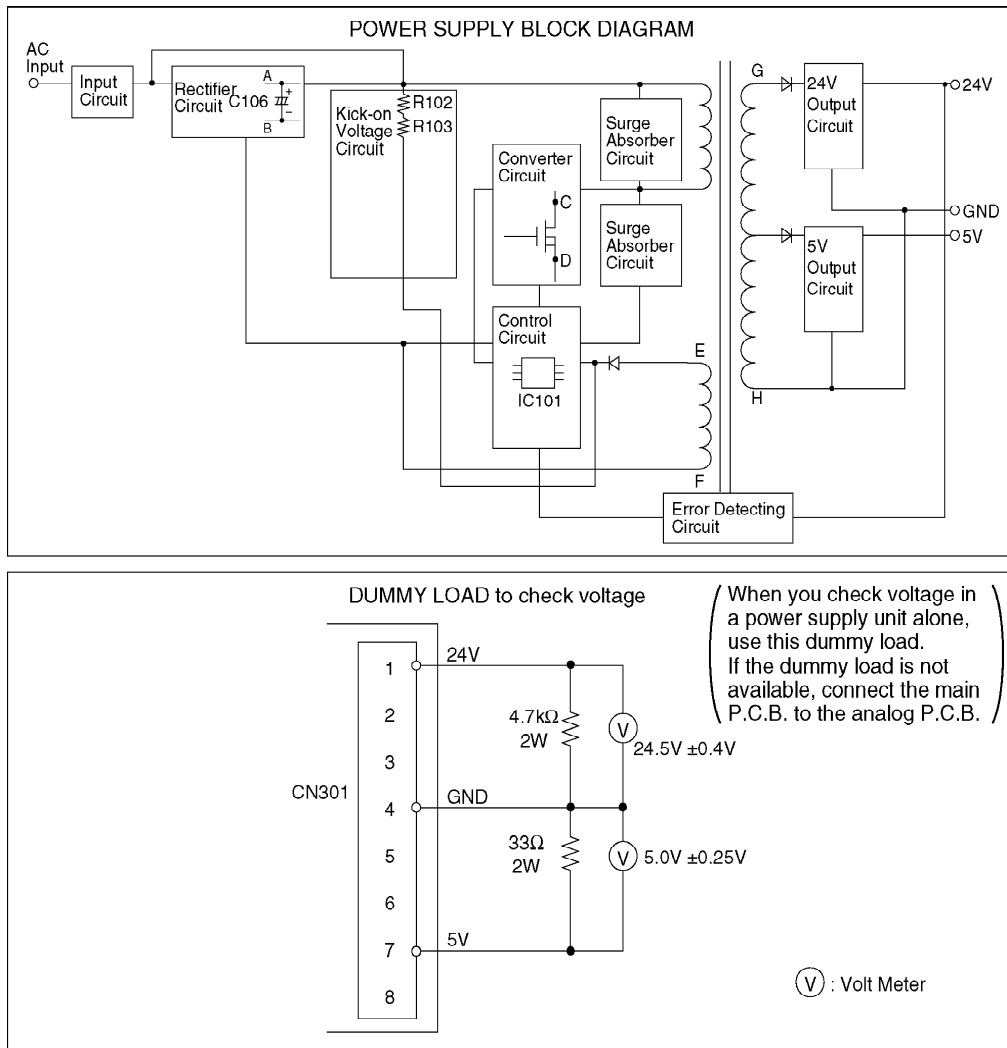
Check the following parts first: F101, D101-D104, C106, Q101, PC101 and IC101.

This comes from our experience with experimental tests. / For example: power supply and lightning surge voltage test, with standing voltage test, intentional short circuit test, etc.

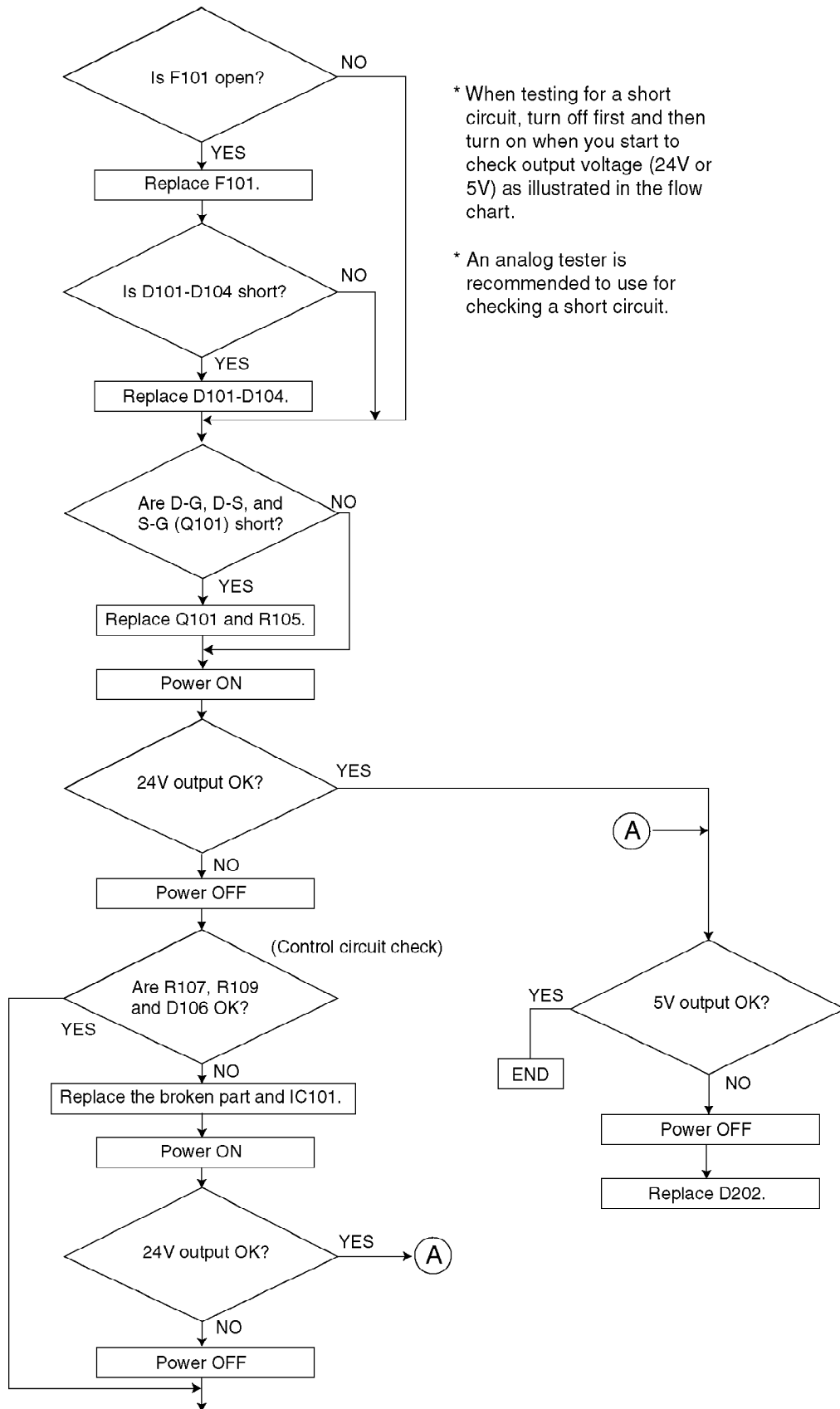
Caution:

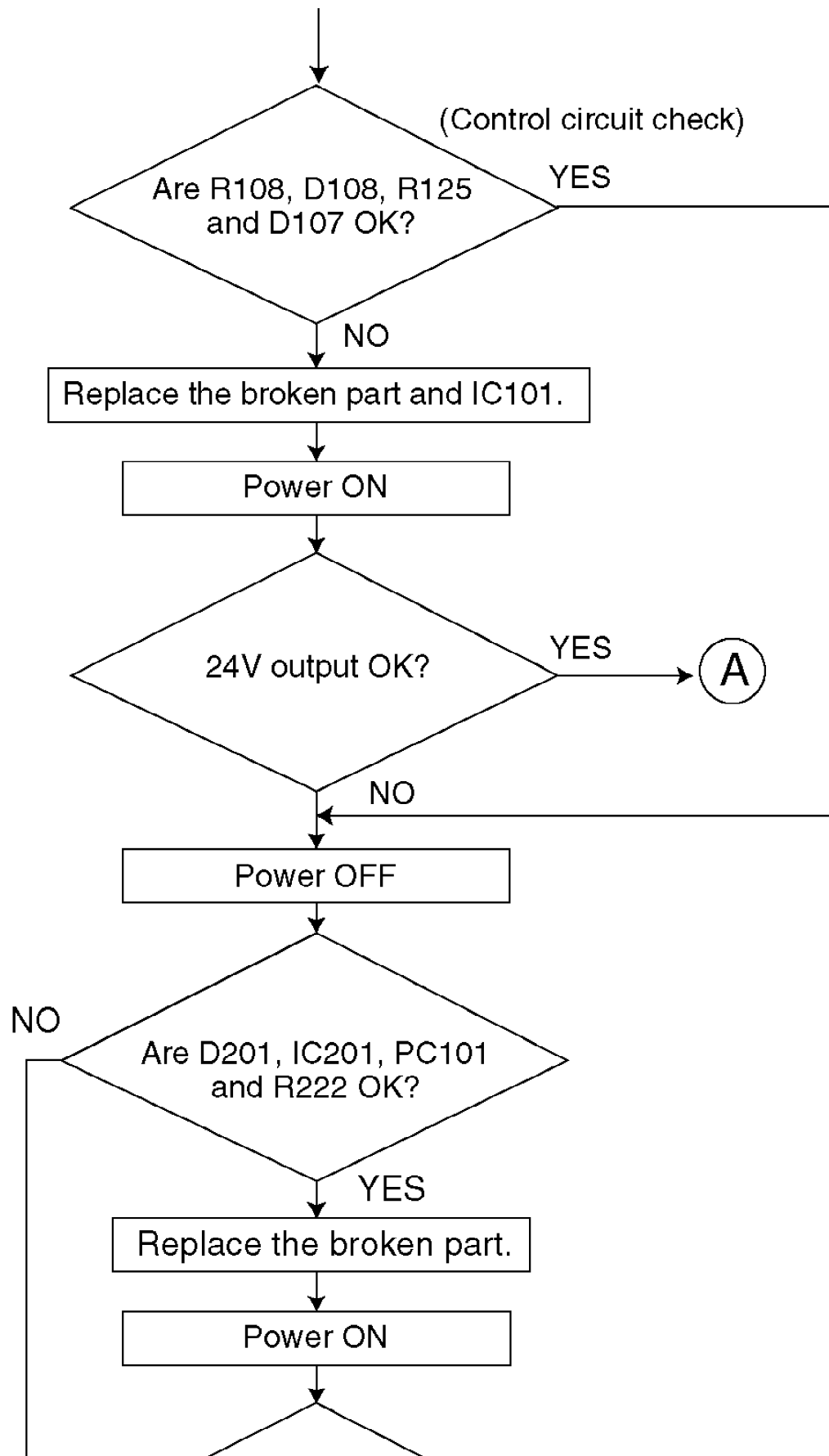
If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

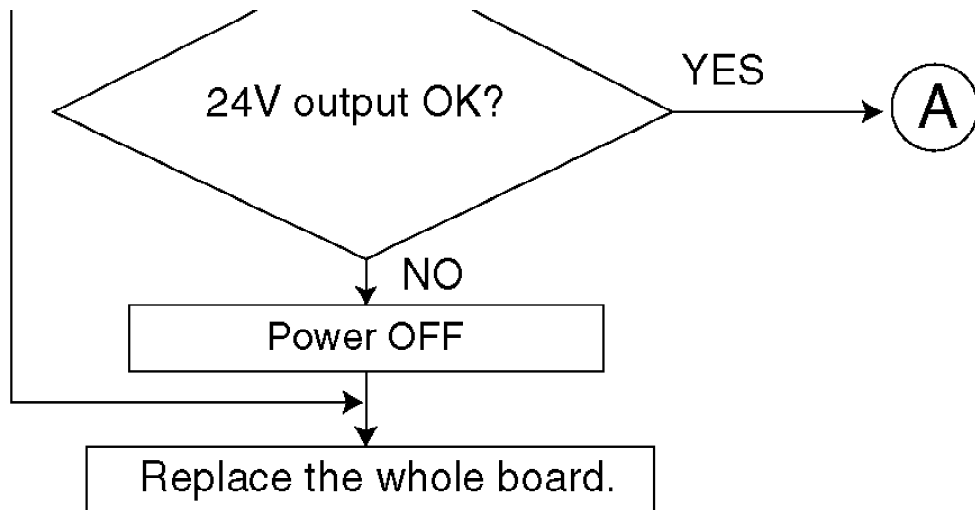
In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.



2. Troubleshooting Flow Chart







3. Broken parts repair details

(D101, D102, D103, D104)

Check for a short-circuit in terminal 4. If D101, D102, D103 and D104 are short-circuited, F101 will melt (open).

In this case, replace all of the parts (D101, D102, D103, D104, F101).

(Q101)

The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101. This is due to a very high voltage through the Gate circuit which is composed of R107, R109, D106 and IC101.

You should change all of the parts listed as follows.

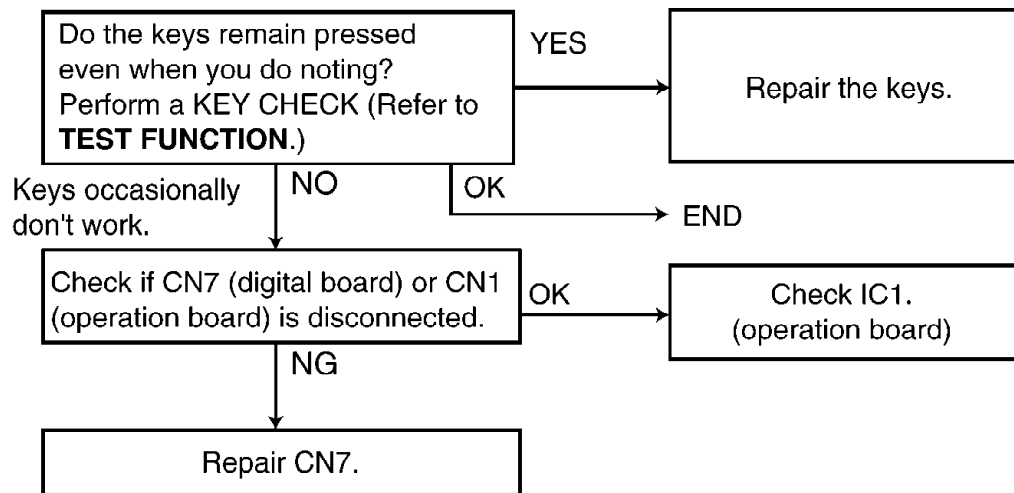
F101, Q101, R107, R109, D106, IC101

(D201)

If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

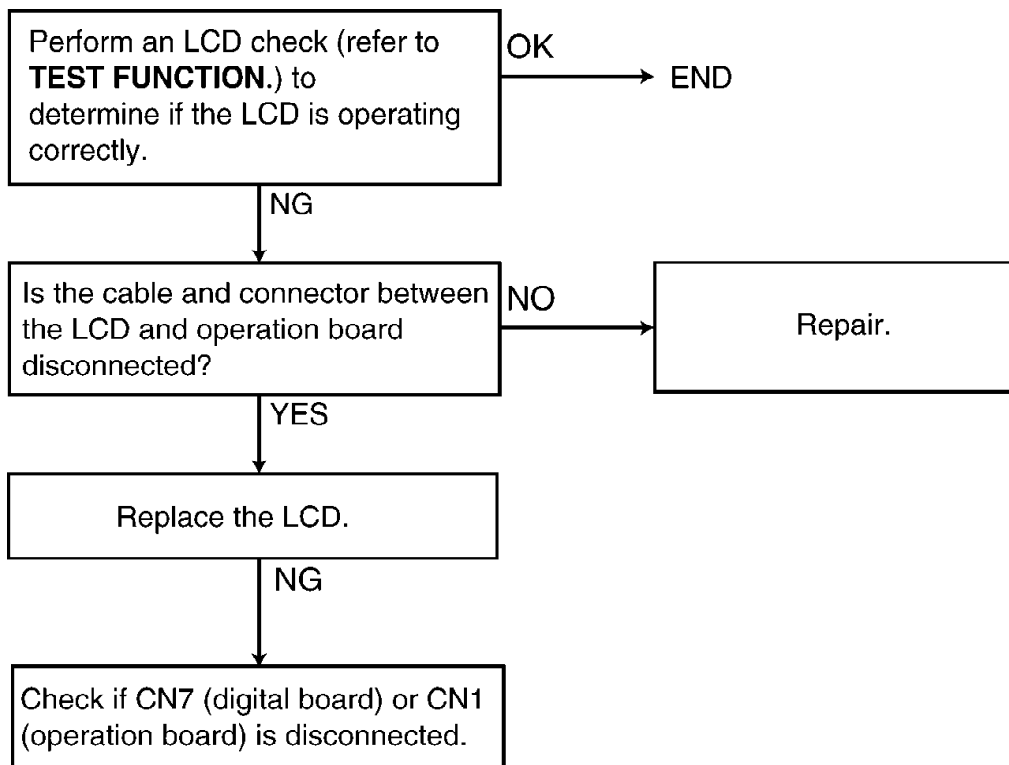
2.3.8. OPERATION BOARD SECTION

2.3.8.1. NO KEY OPERATION



CROSS REFERENCE:
[TEST FUNCTIONS \(\)](#)

2.3.8.2. NO LCD INDICATION

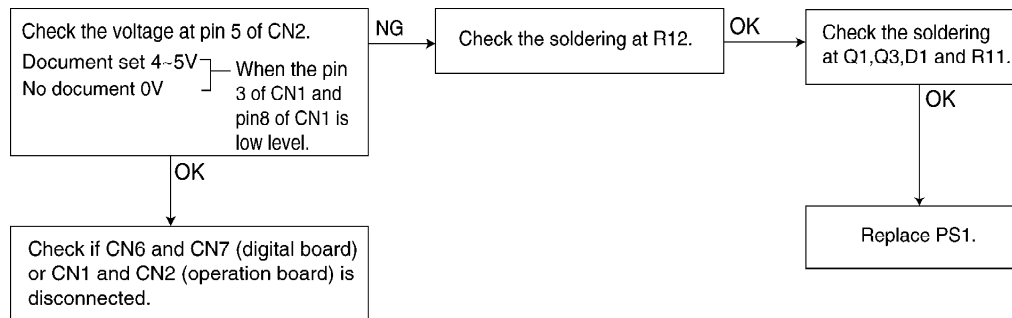


CROSS REFERENCE:
[TEST FUNCTIONS \(\)](#)

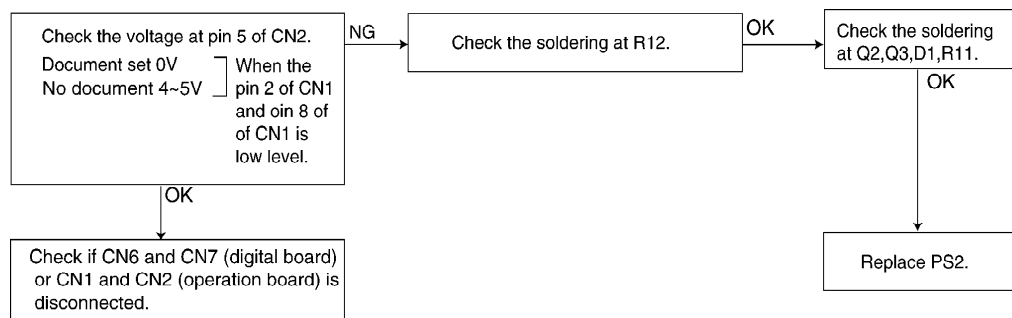
2.3.9. SENSOR SECTION

Refer to [SENSORS AND SWITCHES \(\)](#) for the circuit descriptions.

2.3.9.1. CHECK THE DOCUMENT SENSOR (PS1)....."REMOVE DOCUMENT" /

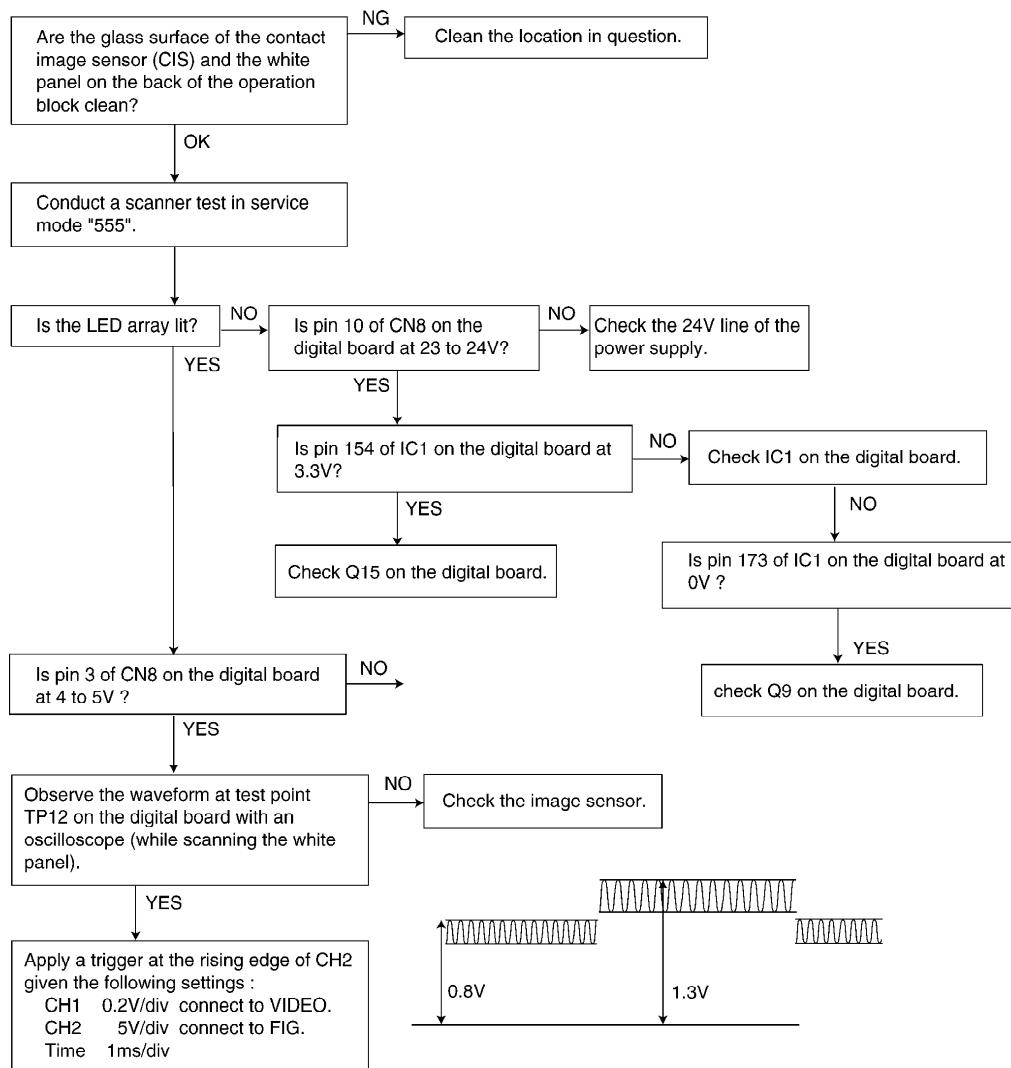


2.3.9.2. CHECK THE READ POSITION SENSOR (PS2)....."CHECK DOCUMENT" /



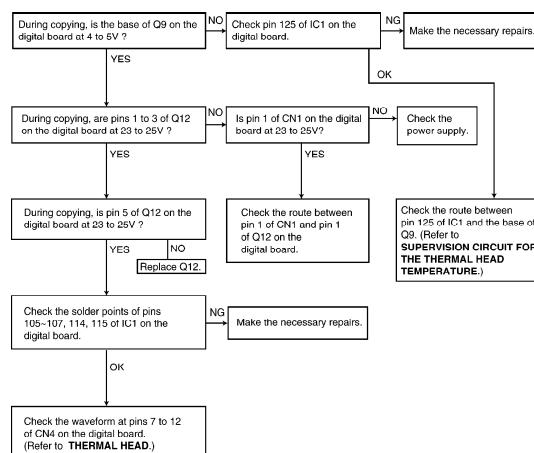
2.3.10. READ SECTION

Refer to **SCANNING BLOCK** ().



2.3.11. THERMAL HEAD SECTION

Refer to **THERMAL HEAD** ().



CROSS REFERENCE:

SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE ()
THERMAL HEAD ()

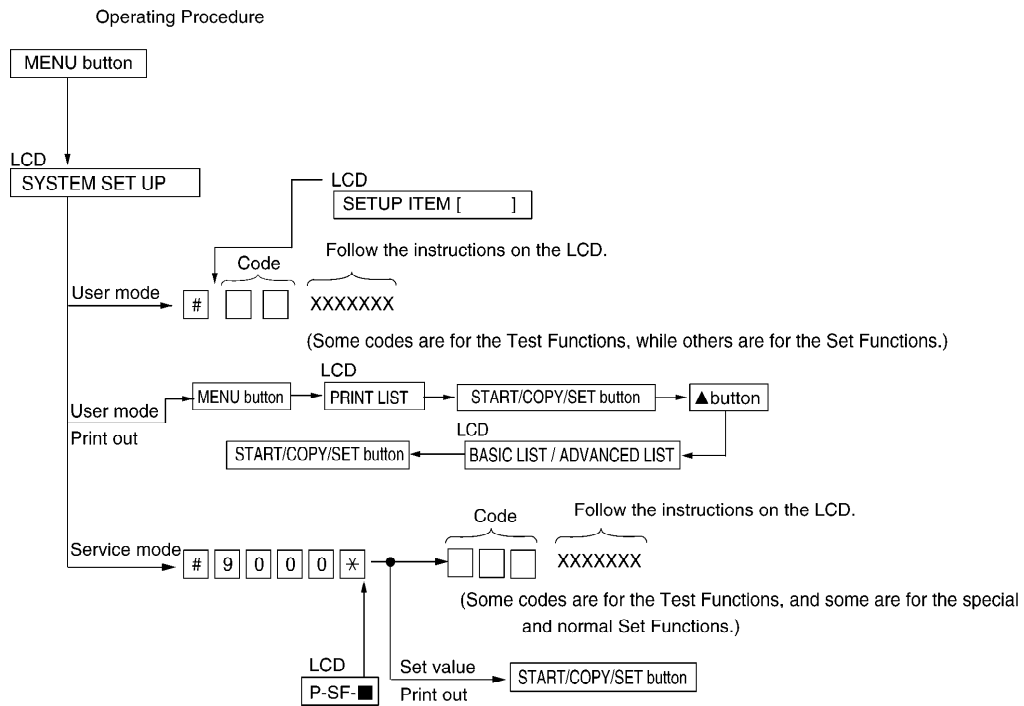
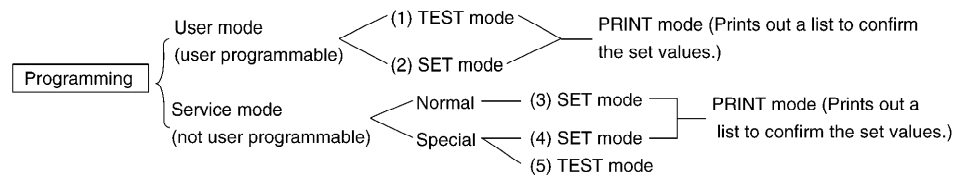
2.4. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the machine, and to test the machine. / Programming can be done in both the on-hook and off-hook conditions. This facilitates communication between the user and the service while programming the machine.

2.4.1. OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and are available to the user. The special programs are only those listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test the various functions. / The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. / The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

2.4.2. OPERATION FLOW



2.4.3. USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)

【 BASIC FEATURE LIST 】

NO.	FEATURE	CURRENT SETTING	
#01	SET DATE & TIME	Apr. 10 2002 11:45AM	
#02	YOUR LOGO		
#03	YOUR FAX NUMBER		
#04	PRINT SENDING REPORT	ERROR	[ERROR, ON, OFF]
#05	AUTO ANSWER MODE	FAX ONLY	[FAX ONLY, TEL/FAX]
#07	FAX RING COUNT	2	[2...9]
#09	TEL/FAX DELAYED RING	2	[2...9]
Code ↗ #13	DIALLING MODE	TONE	[TONE, PULSE]
		Set Value ↘	

【 ADVANCED FEATURE LIST 】

NO.	FEATURE	CURRENT SETTING	
#22	JOURNAL AUTO PRINT	ON	[ON, OFF]
#23	OVERSEAS MODE	OFF	[ON, OFF]
#25	DELAYED SEND	OFF	[ON, OFF]
	DESTINATION =		
	START TIME = 12:00AM		
#30	SILENT FAX RECOGNITION RING	3	[3...9]
#31	RING DETECTION	OFF	[A, B, C, D, OFF]
#41	FAX ACTIVATION CODE	ON	[ON, OFF]
	CODE = *9		
#46	FRIENDLY RECEPTION	ON	[ON, OFF]
#49	AUTO DISCONNECT	ON	[ON, OFF]
	CODE = *0		
#58	ORIGINAL SETTING	NORMAL	[NORMAL, LIGHT, DARKER]
#70	FAX PAGER CALL	OFF	[ON, OFF]
	DESTINATION =		
#76	CONNECTING TONE	ON	[ON, OFF]
Code ↗ #80	SET DEFAULT	Set Value ↘	

Note:

The above values are the default values.

2.4.4. SERVICE FUNCTION TABLE

Code	Function	Set Value	Effective Range	Default	Remarks
501	Setting the pause time	001~600 X 100 msec	001~600	050	Selects the pause time in msec steps.
502	Setting the flash recall time	01~99 X 10 msec	01~99	10	Selects the line break time flashing in 10 msec steps.
503	Setting the pulse dial speed	1:10pps 2:20pps	1, 2	1	Sets the pulse dial speed.
520	Setting the CED frequency	1:2100Hz 2:1100Hz	1, 2	1	When international communications cannot be performed smoothly select 1100Hz. However some external system should not be accurate (1100Hz on CED). (See "5. copy, but cannot transmit/long distance or international communications" in DEFECTIVE FACSIMILE SECTION (.)
521	Setting the international line mode	1:ON 2:OFF	1, 2	1	Selects the international line during FAX communication "5. Unit can copy, but cannot transmit/receive long distance international communication" in DEFECTIVE FACSIMILE SECTION (.)
522	Auto standby select	1:ON 2:OFF	1, 2	1	Set the resolution and conditions for FAX or copy default settings.
523	Receive equalizer select	1:ON 2:OFF	1,2	2	When the telephone station from the unit or reception be performed correctly, adjust accordingly.
524	SND EQL.	1:ON 2:OFF	1,2	2	When the telephone station from the unit or reception be performed correctly, adjust accordingly.
531	Release PIN code for DIAL LOCK	1:ON 2:YES	1,2	1	When you want to release code for dial lock, press the key. Then the setting value to the default.
544	Selecting the document feed position	01~99 step	00~99	50	When the ADF function is incorrect, adjust the feed position (8 step = 1mm)
550	Memory clear				Press "START/COPY/SET"
551	ROM version and sum check				Press "START/COPY/SET"
553	Setting the FAX monitor function	1: OFF 2:PHASE B 3:ALL	1, 2, 3	1	Sets whether to monitor the signal with the unit's speaker during FAX communication

Code	Function	Set Value	Effective Range	Default	Remarks
554	Modem test				Press "START/COPY/SET"
555	Scanner test				Press "START/COPY/SET"
556	Motor test				Press "START/COPY/SET"
557	LED test				Press "START/COPY/SET"
558	LCD test				Press "START/COPY/SET"
559	Setting the document jam detection	1:ON 2:OFF	1, 2	1	Selects the jam detection of document during FAX transmission/copying.
561	KEY test				Press any key.
570	Setting the % break	1:61% 2:67%	1, 2	2	Sets the % break of pulse
571	Setting the number of times that ITS is redialed	00~99	00~99	03 times	Selects the number of times ITS is redialed (not including first dial).
572	Setting the ITS redial interval	001~999 sec	001~999	065 sec	Sets the interval of ITS redial
573	Setting of number of rings for REMOTE TURN ON	01~99	01~99	10 times	Sets the number of rings before the unit starts to receive a document in the TEL mode
590	Setting the number of FAX redial times	00~99	00~99	05 times	Selects the number of redials during FAX communication including the first dial).
591	Setting the FAX redial interval	001~999 sec	001~999	065 sec	Sets the FAX redial interval during FAX communication.
592	Designation of CNG sending	1: OFF 2:ALL 3: AUTO	1, 2, 3	2	Lets you select the CNG output during FAX transmission. CNG is output at phase A. CNG is output only when automatic dialing is performed. OFF: CNG is not output at
593	Setting the interval between CED and the 300 bps signal	1: 75 msec 2:500 msec 3:1000 msec	1, 2, 3	1	Sets the interval between the CED signal and subsequent 300 bps signal. (See "5. Unit cannot transmit/receive long distance or international communications" in DEFECT FACSIMILE SECTION (.))

Code	Function	Set Value	Effective Range	Default	Remarks
594	Setting the overseas DIS detection	1: Detects on the 1st time.2: Detects on the 2nd time.	1, 2	1	Sets the recognition format for the DIS signal. 1:Detects the first DIS signal sent from the receiver during FAX transmission. Ignores the first DIS signal from the receiver during FAX transmission. (See "5. Unit can copy, but cannot transmit/long distance or international communications" in DEFECTIVE FACSIMILE SECTION ().)
595	Setting an acceptable reception error value	001~999 X number of times	001~999	100	Sets the number of acceptable error lines when the FAX reconstructs the received signal.
596	Setting the transmit level	- 15~00	- 15~00	- 11 dBm	Selects the FAX transmission level.
598	Receiving Sensitivity	20~48	20~48	45	(See "5. Unit can copy, but cannot transmit/receive long distance or international communications" in DEFECTIVE FACSIMILE SECTION ().)
717	Transmit speed select	1:9600BPS 2: 7200BPS 3: 4800BPS 4: 2400BPS	1~4	1	Adjusts the speed to start during FAX transmission.
718	Receive speed select	1:9600BPS 2: 7200BPS 3: 4800BPS 4: 2400BPS	1~4	1	Adjusts the speed to start during FAX reception.
719	Ringer off in TEL/FAX mode	1:ON 2:OFF	1, 2	1	Sets the ringer switch off when a call is received in the TEL/FAX mode.
721	Pause tone detect	1:ON 2:OFF	1, 2	1	Selects the tone detection pauses in dialing.
722	Redial tone detect	1:ON 2:OFF	1, 2	1	Selects the tone detection after redialing.
763	CNG detect time	1:10 sec 2:20 sec 3:30 sec	1, 2, 3	2	Selects the CNG detection time for friendly reception.
771	T1 timer	1:35 sec 2:60 sec	1, 2	1	Sets a higher value when there is no response from the other party needs more time during FAX transmission.
774	T4 timer	00~99	00~99	00	
815	Sensor check				Press "START/COPY/SET"

2.4.5. SERVICE MODE SETTINGS (Example of a printed out list)

【 SERVICE DATA LIST 】

```

501 PAUSE TIME           = 050*100ms      [001...600]*100ms
502 FLASH TIME          = 10*10ms       [01...99]*10ms
503 DIAL SPEED           = 10pps         [1=10    2=20]pps
520 CED FREQ.           = 2100Hz        [1=2100  2=1100]Hz
521 INTL. MODE           = ON            [1=ON    2=OFF]
522 AUTO STANDBY        = ON            [1=ON    2=OFF]
523 RCV EQL.            = OFF           [1=ON    2=OFF]
524 SND EQL.            = OFF           [1=ON    2=OFF]

```

← Code ← Set Value

【 SPECIAL SERVICE SETTINGS 】

```

544 553 559 570 571 572 573 590 591 592 593 594 595
 50   1   1   2   05 065  10   05 065   2   1   1  100

596 598 717 718 719 721 722 763 771 774
 11  45   1   1   1   1   1   2   1   00

```

← Code
 ← Set Value

Note:

The above values are the default values.

【 HISTORY 】

```

1. DATE
  Apr. 10 2002 11:45AM
  TIME=00002 HOURS
2. KEY OPERATION
  1ST. 50:
    01 01 3C 3A 31 04 3A 34 31 3A 04 31 31 34 35 04 01 01 05 05 05 05 04 04 05
    05 05 05 04 0C 04 01 01 05 3C 39 3A 3A 3A 3B 04 00 00 00 00 00 00 00 00
  LAST 50:
    05 05 05 04 0C 04 01 01 05 3C 39 3A 3A 3A 3B 04 00 00 00 00 00 00 00 00
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
3. NUMBER OF COPY
  =00000
4. NUMBER OF RX
  =00000
5. NUMBER OF TX
  =00000

YOUR LOGO
YOUR FAX NUMBER

```

2.4.6. OTHER

[HISTORY]

No.	Display	Function
1	DATA	Date and time which are set by a user for the first time after purchase. TIME is the expiration from the first power on after purchase.
2	KEY OPERATION	Indicate 2-digit codes. (Refer to BUTTON CODE TABLE ()). 1st.50: History of the key operation from 1st to 50th after purchase. Last.50: History of the last 50 key operations.
3	NUMBER of COPY	The number of pages copied..
4	NUMBER of RX	The number of pages received.
5	NUMBER of TX	The number of pages sent.

2.4.7. SPECIAL SERVICE JOURNAL REPORTS

Example:

Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 882. Remote printing function for the journal reports (JOURNAL and JOURNAL 3) is also available for service technicians. (Refer to **REMOTE PROGRAMMING** ().) The JOURNAL report only gives you basic information about a communication, but the JOURNAL 3 report provide different information on the same item (communication).

JOURNAL									
Jan.19 2002 20:23									
NO.	OTHER	PACSIMILE	START TIME	USAGE TIME	MODE	PAGES	RESULT	*CODE	
01	3332222		Jan. 01 00:02AM	00'48	RCV.	01	OK		
02	9998745		Jan. 01 00:03AM	00'09	FND.	00	OK		
03	John		Jan. 01 00:35AM	00'34	RCV.	01	OK		
04	5555555		Jan. 01 00:36AM	02'38	RCV.	00	PRESSED THE STOP KEY (43)		

JOURNAL 3									
Jan. 12 2009 09:53PM									
NO.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
NO.	TX/TYPE	MSLT	RESOL.	SPEED	RCV-TX/TYPE	RCV-TX/TYPE	RCV-TX/TYPE	RCV-TX/TYPE	RCV-TX/TYPE
01	NR	20msc	STD.	9600BPS	MAN	RCV	000000	00000	79
02	NR	20msc	STD.	9600BPS	?	RCV	000181	00000	00
03	NR	20msc	STD.	9600BPS	MAN	RCV	000078	00000	00
04	NR	20msc	STD.	9600BPS	MAN	RCV	000000	00000	00

HOW TO READ JOURNAL REPORTS:

1. Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 3. You can get the following information.

* MODE: Fax transmission / * TX SPEED: 9.6 kbps / * RESOLUTION : standard / * ENCODE: MH / * MAKER CODE: 79

For further details, see **JOURNAL 3** ().

2.4.7.1. JOURNAL 3

Descriptions:

1. ENCODE

Compression Code: MH/MR

2. MSLT

MSLT means Minimum Scan Line Time. Used only at the factory.

3. RESOLUTION (RESOL)

Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, “?” is displayed.

4. SPEED

Indicates the speed of communication. If multiple pages are transmitted or received, it indicates the last page's communication speed. If there is a communication error, “?” is

displayed.

5. RCV-TRIG. (CNT.)

Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 3 in 2.4.7.2. PRINTOUT EXAMPLE. The values in parentheses indicate how many times the trigger has been used. (For example, “0003” means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
5	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
6	TURN-ON	Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
7	TIME OUT	Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.
8	IDENT	Means the unit detected Ring Detection.
9	TEL/FAX	Means the unit detected the CNN while it was sending the Dummy Ring Back To in the TEL/FAX mode.

[NO RESPONSE DISAPPEARED ON JOURNAL]

The “NO RESPONSE DISAPPEARED ON JOURNAL” displays the information about the last 10 communications terminated by “No Response”. (Some of the communications terminated by “No Response” were not displayed in the JOURNAL.) When a fax transmission cannot be performed because the other party's unit is set to the TEL mode, “No response” will be printed.

6. EQM

EQM means Eye Quality Monitor. Used only at the factory.

7. ERROR LINE(RX)

When an error occurs while receiving a fax, this shows the number of error lines.

8. MAKER CODE

This shows a 2 digit code of the other party's fax machine brand.
0E: “KX” model / 00: Unknown / 79: “UF” model / 19: “Xerox” model

2.4.7.2. PRINTOUT EXAMPLE

[JOURNAL3]

01 ENE. 1999 12:04AM

NO.	ENCODE	MSLT	RESOL	SPEED	RCV-TRIG.	EGM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	20mSec	STD.	9600BPS	?	000000	00000	0E

2.5. TEST FUNCTIONS

Test Mode	Type of Mode	Code	Function
		Operation after code input	
PRINT TEST	Service Mode	"8" "5"	Prints a test pattern and checks the thermal head abnormalities (missing dots, etc), and also checks operation of the reception motor.(Refer to JOURNAL3)
		START	
MOTOR TEST	Service Mode	"5" "5" "6"	Rotates the transmission and reception motors to the operation of the motors. 0.....Stop 1.....Turn forward TX roller at 400pps 2-2 phase 2.....Turn forward TX roller at 400pps 1-2 phase 3.....Turn forward RX roller at 400pps 2-2 phase 4.....Turn forward RX roller at 400pps 1-2 phase 5.....Turn forward TX/RX roller at 400pps 1-2 phase 6.....Reverse the motor at 400pps 1-2 phase 7.....Set the cam gear to the home position 8.....Set the cam gear to the RX mode 9.....Set the cam gear to the copy mode press the STOP button to cancel.
		START	
MODEM TEST	Service Mode	"5" "5" "4"	Sends four kinds of FAX signals to check the send function of the modem. / 1)1100 Hz: Consecutive EOM for tonal / 2)2100 Hz: G2 carrier signal / Control of CED signal / 3)G3,V29 training signal [modulation of carrier signal (1700 Hz)]
		START	
ROM CHECK	Service Mode	"5" "5" "1"	Indicates the version and checks the sum of the ROM
		START	
SCAN CHECK	Service Mode	"5" "5" "5"	Turns on the LEDs of the image sensor and operates read systems.
		START	
LCD CHECK	Service Mode	"5" "5" "8"	Checks the LCD indication.Illuminates all the dots if they are normal.
		START	
DTMF SINGLE TEST	Service Mode	"5" "5" "2"	Outputs the DTMF as single tones. Used to check frequencies of the individual DTMF tones. Refer to SINGLE TONE TRANSMIT SELECTION ().
		1....ON 2....OFF	
KEY CHECK	Service Mode	"5" "6" "1"	Checks the button operation. Indicates the button code on the LCD while the button is pressed. Refer to BUTTON CODE TABLE ().
		START (any key)	
FACTORY SET	Service Mode	"5" "5" "0"	Clears the memory where the users can store data.
		START	

Test Mode	Type of Mode	Code	Function
		Operation after code input	
SENSOR CHECK & VOX CHECK	Service Mode	“8” “1” “5”	CHECKS THE SENSOR OPERATION After entering this mode, perform the copy operation. For each sensor's operation, refer to SENSORS AND SWITCHES() . [Do Sn Pa] : LCD DISPLAY Do: Document set sensor :Paper inserted. Turns on when a document is inserted. Sn: Read position sensor. :At the read position, turns on when the front cover is opened and the sensor lever is pressed down. Pa: Recording Paper Sensor :Set Recording Paper. Turns on and off when the lock lever is pushed down and up.
		START	

2.5.1. DTMF SINGLE TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	key	Low Frequency (Hz)
“1”	697	“5”	1209
“2”	770	“6”	1336
“3”	852	“7”	1477
“4”	941	“8”	1633



When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz)	1209	1336	1477
Low (Hz)			
697	"1"	"2"	"3"
770	"4"	"5"	"6"
852	"7"	"8"	"9"
941	"✕"	"0"	"#"

Note:

After performing this check, do not forget to turn the setting off.
Otherwise, dialing in DTMF signal will not work.

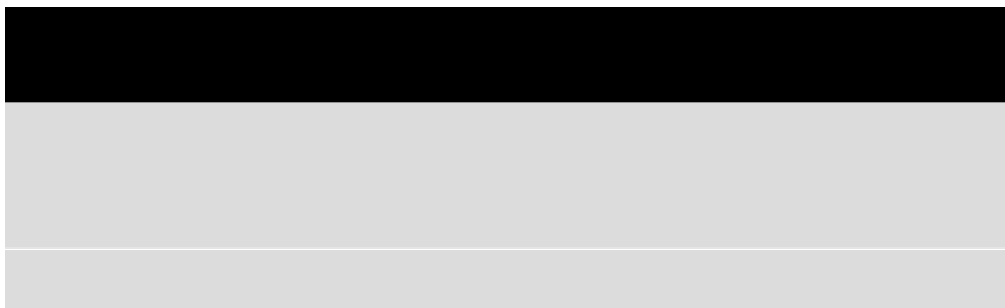
2.5.2. BUTTON CODE TABLE

Code	Button Name	Code	Button Name	Code	Button Name
02	RESOLUTION	31	1	87	STATION 1
03	MODE RECEIVE	32	2	88	STATION 2
04	START/COPY/SET	33	3	89	STATION 3
05	MEMU	34	4	3A	0
07	HELP	35	5	3B	✕
08	MONITOR	36	6	3C	#
0B	LOWER	37	7	3D	REDIAL/PAUSE
0C	DIRECTORY	38	8	3E	FLASH
0D	 VOLUME	39	9	00	NO INPUT
0E	 VOLUME	38		01	STOP

Note:

These codes (00, 01) are only for the data in the History Report.

2.5.3. PRINT TEST PATTERN



3. DISASSEMBLY INSTRUCTIONS

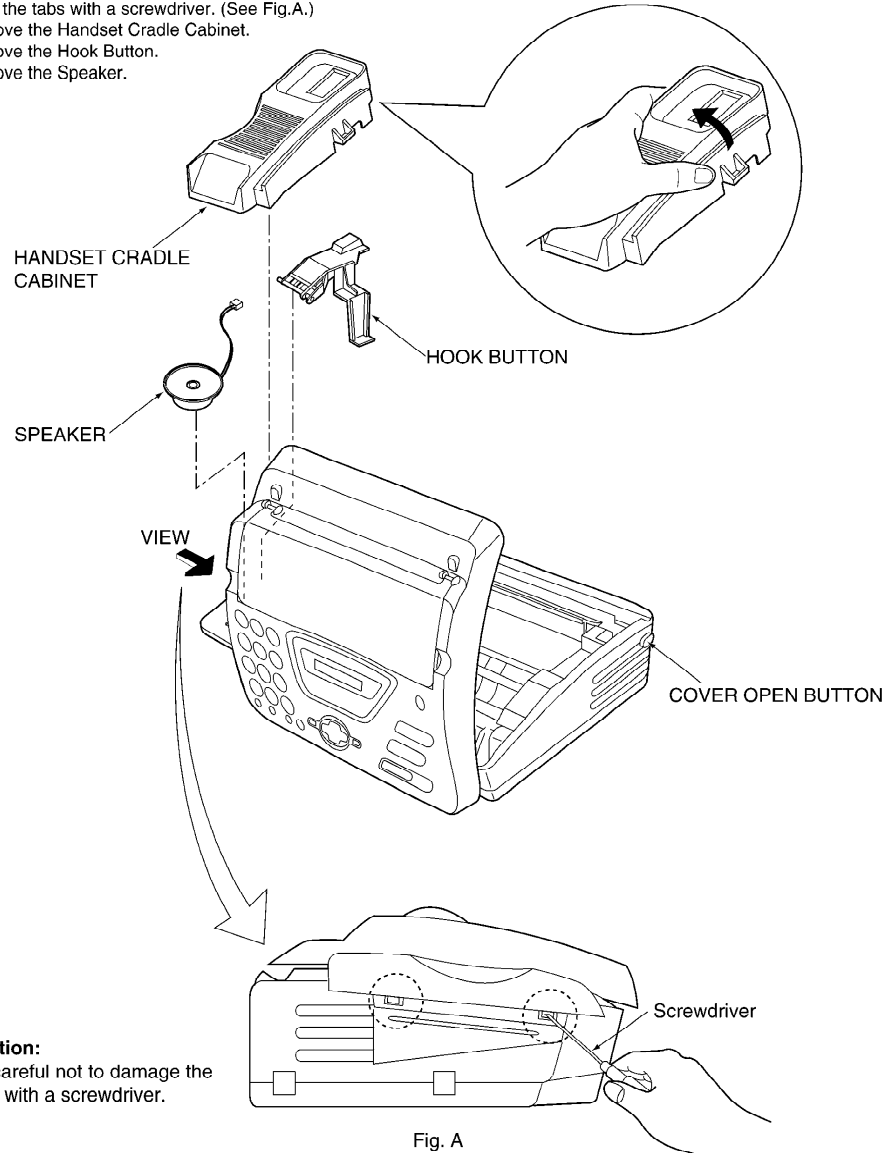
3.1. HOW TO REMOVE THE HANDSET CRADLE CABINET, HOOK

BUTTON AND SPEAKER

Procedure: 1

REF No. 1

- 1) Push the cover open button.
- 2) Push the tabs with a screwdriver. (See Fig.A.)
- 3) Remove the Handset Cradle Cabinet.
- 4) Remove the Hook Button.
- 5) Remove the Speaker.

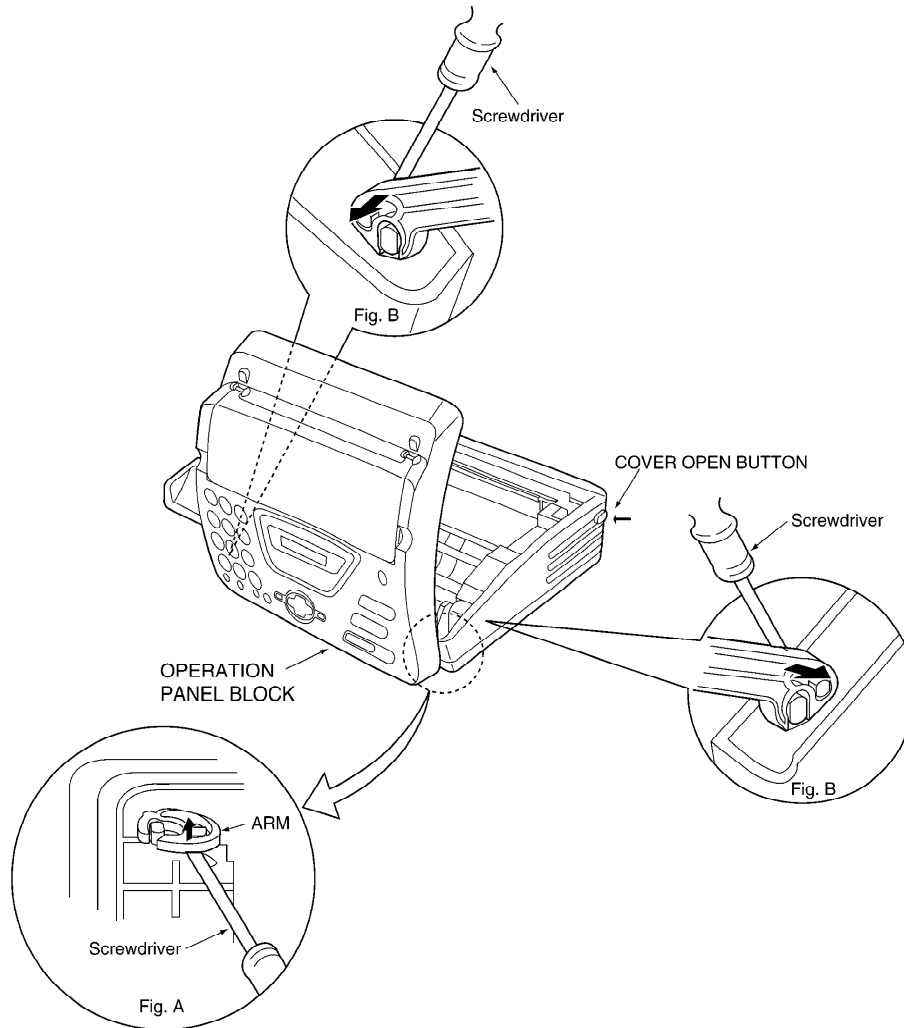


3.2. HOW TO REMOVE THE OPERATION BLOCK

Procedure: 2

REF No. 2

- 1) Unhook all the connectors connecting the main cabinet with the OPERATION PANEL BLOCK .
- 2) Push the cover open button in the direction of the arrow to open the operation block.
- 3) Tilt the unit vertically so that its left side faces down the grey-shaded ARM as illustrated in Fig. A, insert a screwdriver and unlatch the ARM as illustrated in Fig. A.
- 4) Pull out both sides of the arms in the direction of the arrow shown in Fig. B.
- 5) Remove the OPERATION PANEL BLOCK.

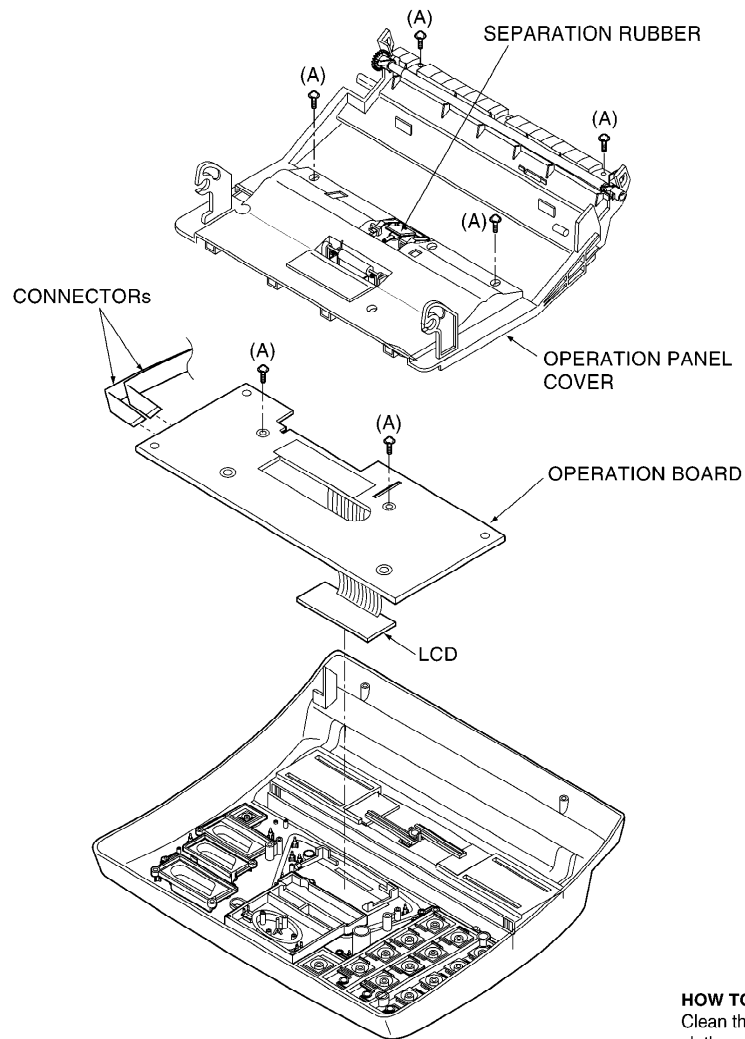


3.3. HOW TO REMOVE THE OPERATION BOARD AND LCD

Procedure: 2→3

REF No. 3

- 1) Remove the 4 screws (A) and the Operation Panel Cover.
- 2) Remove the 2 screws (A) on the Operation Board and LCD.
- 3) Remove the Operation Board.
- 4) Remove the connectors.



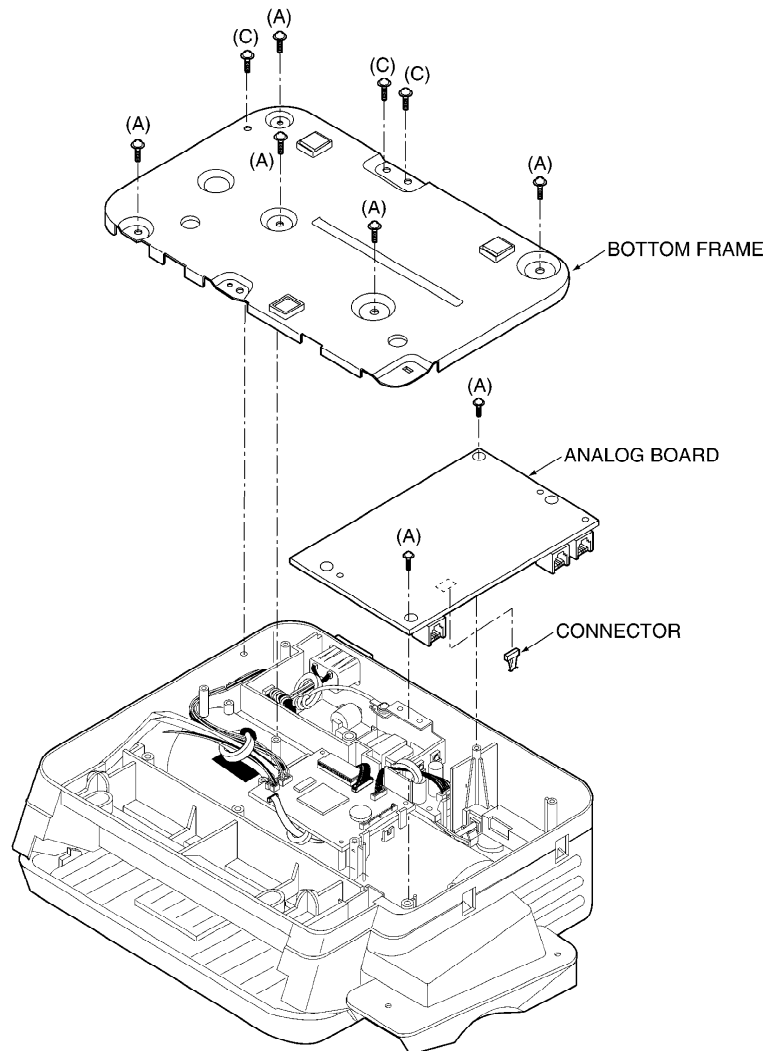
HOW TO CLEAN:
Clean the roller with a
cloth soaked in alcohol.

3.4. HOW TO REMOVE THE BOTTOM FRAME AND ANALOG BOARD

Procedure: 4

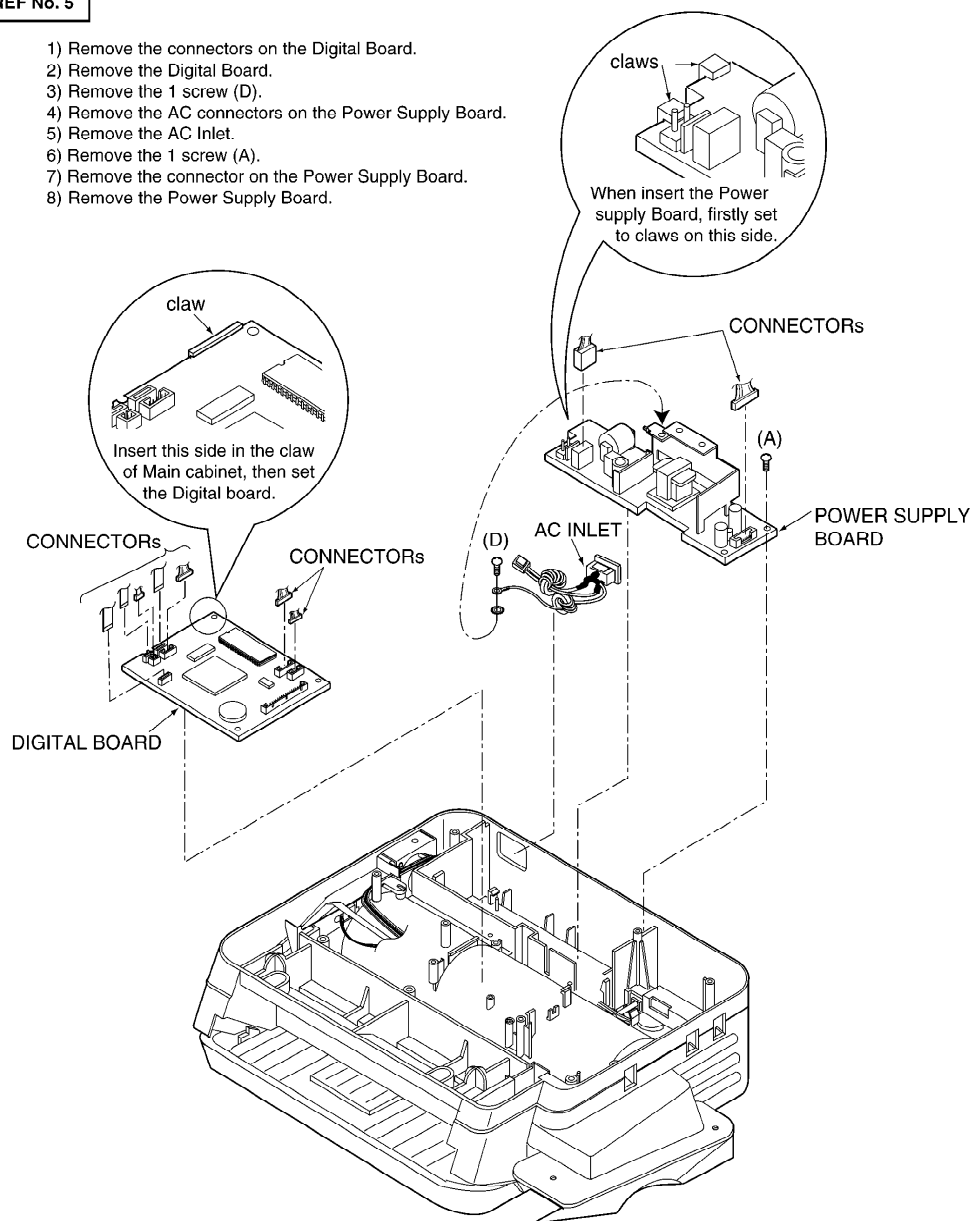
REF No. 4

- 1) Remove the 5 screws (A) and 3 screws (C) on the Bottom Frame.
- 2) Remove the Bottom Frame.
- 3) Remove the 2 screws (A) on the Analog Board.
- 4) Remove the connector.
- 5) Remove the Analog Board.



3.5. HOW TO REMOVE THE DIGITAL, POWER SUPPLY BOARD AND AC INLET

- 1) Remove the connectors on the Digital Board.
- 2) Remove the Digital Board.
- 3) Remove the 1 screw (D).
- 4) Remove the AC connectors on the Power Supply Board.
- 5) Remove the AC Inlet.
- 6) Remove the 1 screw (A).
- 7) Remove the connector on the Power Supply Board.
- 8) Remove the Power Supply Board.

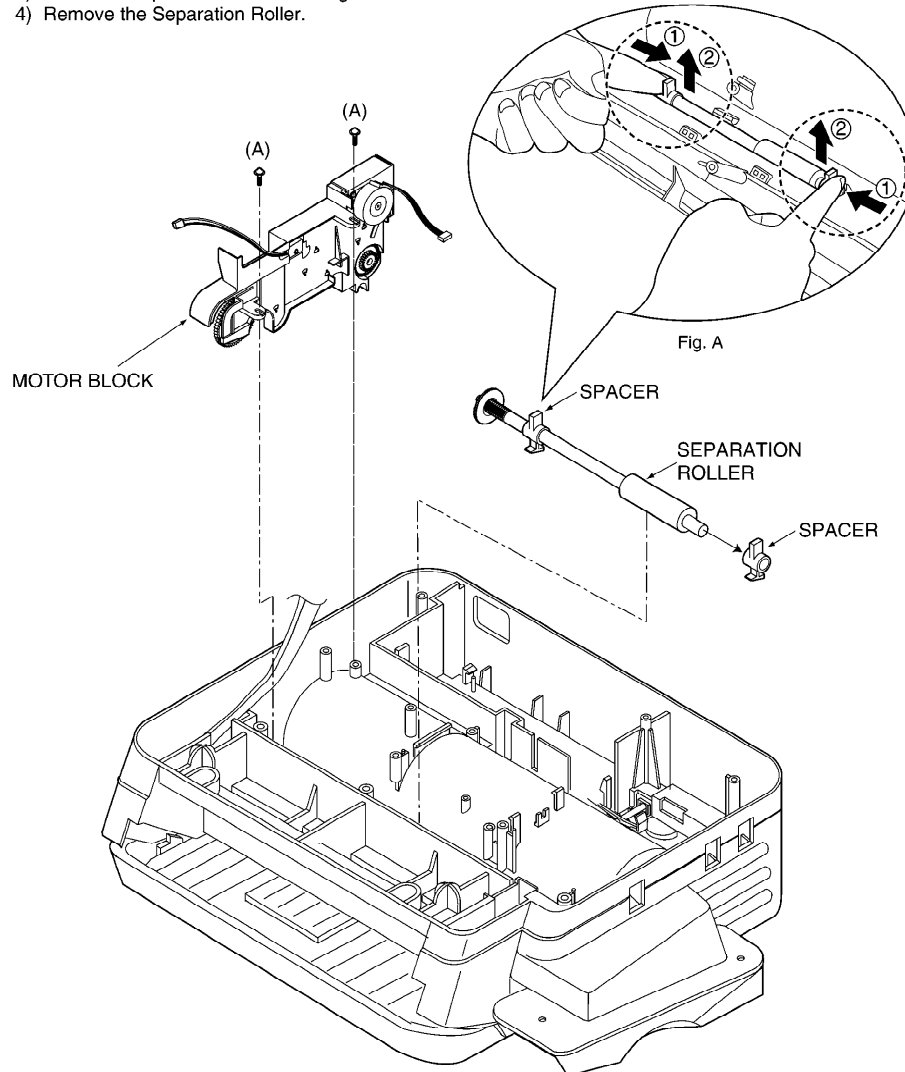


3.6. HOW TO REMOVE THE MOTOR BLOCK AND SEPARATION ROLLER

Procedure: 4→5→6

REF No. 6

- 1) Remove the 2 screws (A).
- 2) Remove the MOTOR BLOCK.
- 3) Unlock the Spacers as shown in Fig. A.
- 4) Remove the Separation Roller.

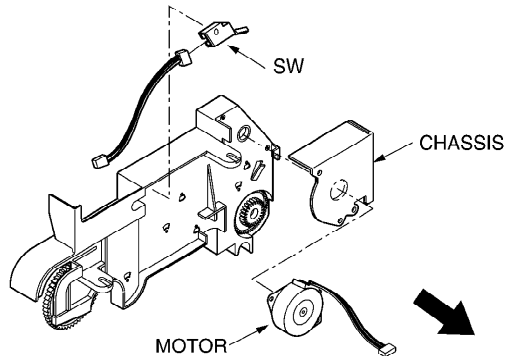


3.7. HOW TO REMOVE THE MOTOR AND GEARS OF MOTOR BLOCK

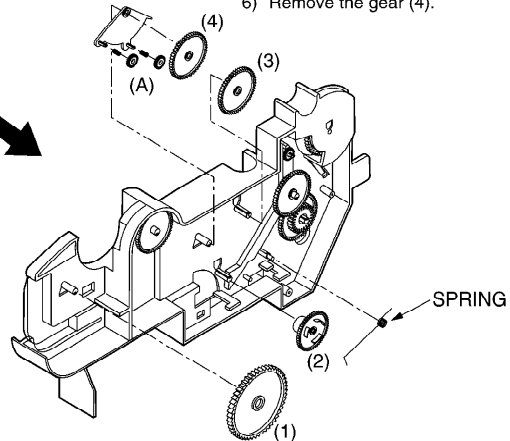
Procedure: 4→5→6→7

REF No. 7

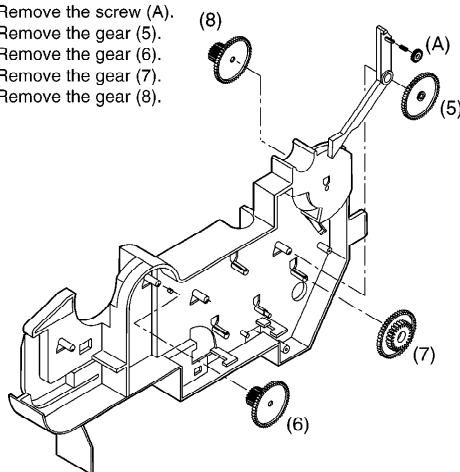
- 1) Remove the SW.
- 2) Remove the MOTOR.
- 3) Remove the CHASSIS.



- 1) Remove the SPRING.
- 2) Remove the gear (1).
- 3) Remove the gear (2).
- 4) Remove the gear (3).
- 5) Remove the screw (A).
- 6) Remove the gear (4).

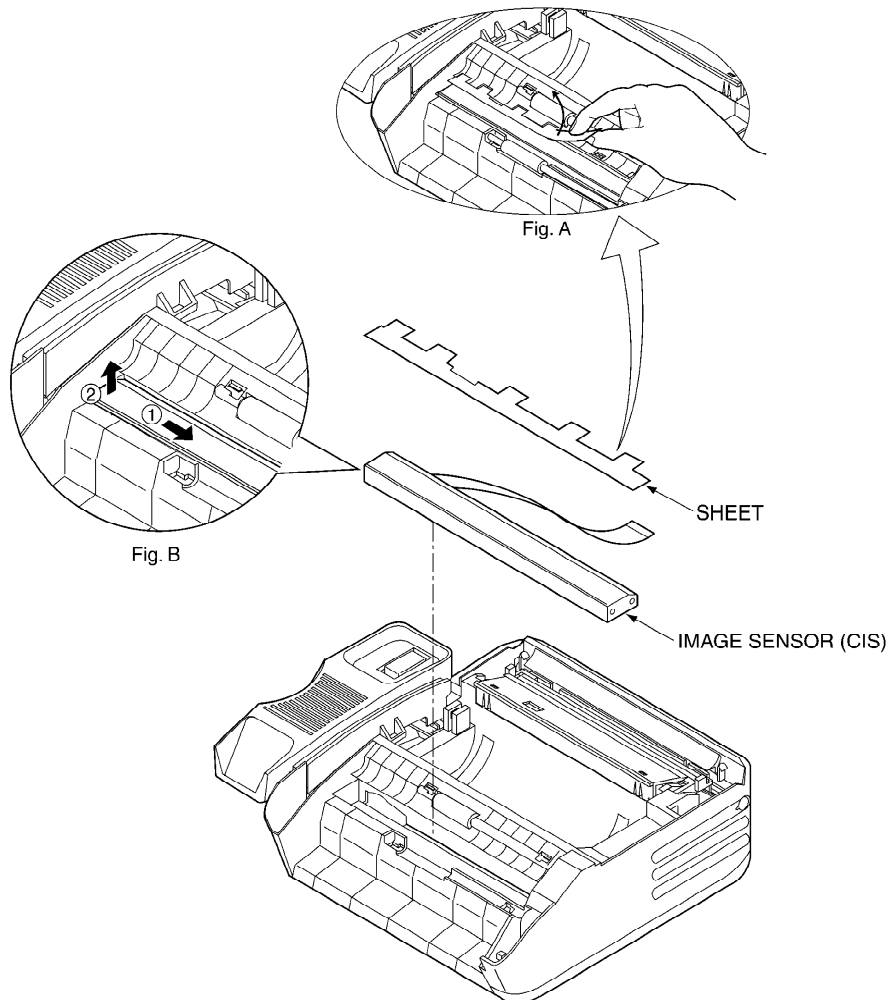


- 1) Remove the screw (A).
- 2) Remove the gear (5).
- 3) Remove the gear (6).
- 4) Remove the gear (7).
- 5) Remove the gear (8).



3.8. HOW TO REMOVE THE IMAGE SENSOR (CIS)

- 1) Remove the Sheet as shown in Fig. A.
- 2) Remove the Image Sensor (CIS) as shown in Fig. B.

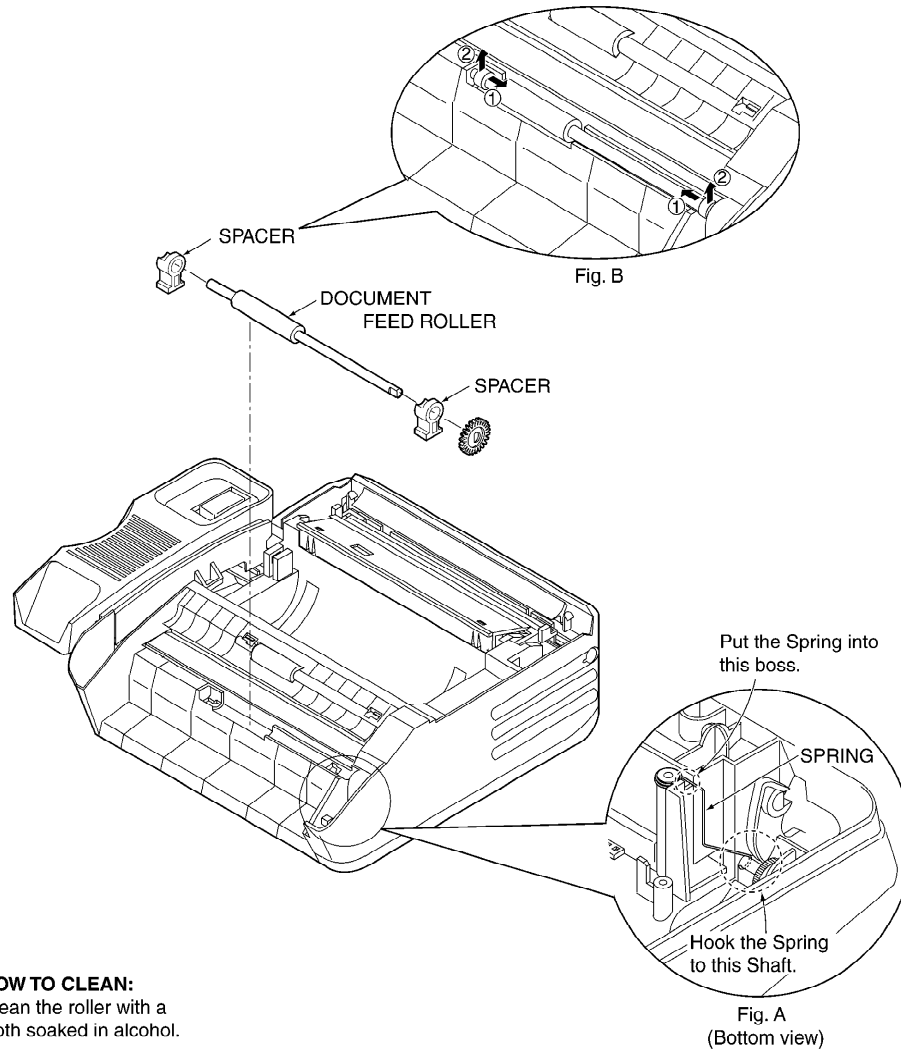


3.9. HOW TO REMOVE THE DOCUMENT FEED ROLLER

- 1) Unhook the Spring as shown in Fig. A.
- 2) Unrock the Spacers as shown in Fig. B.
- 3) Remove the Document Feed Roller.

Note:

When insert the document Feed Roller, hook the Spring to the shaft.

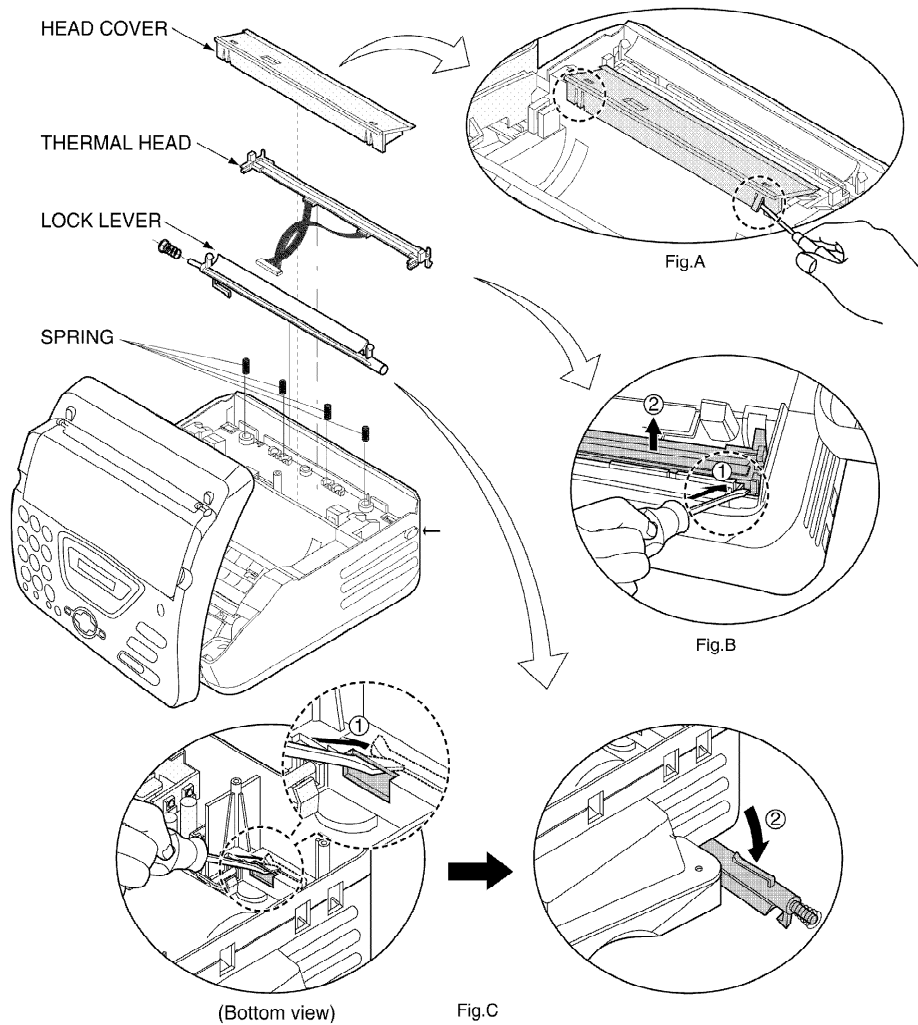


3.10. HOW TO REMOVE THE THERMAL HEAD

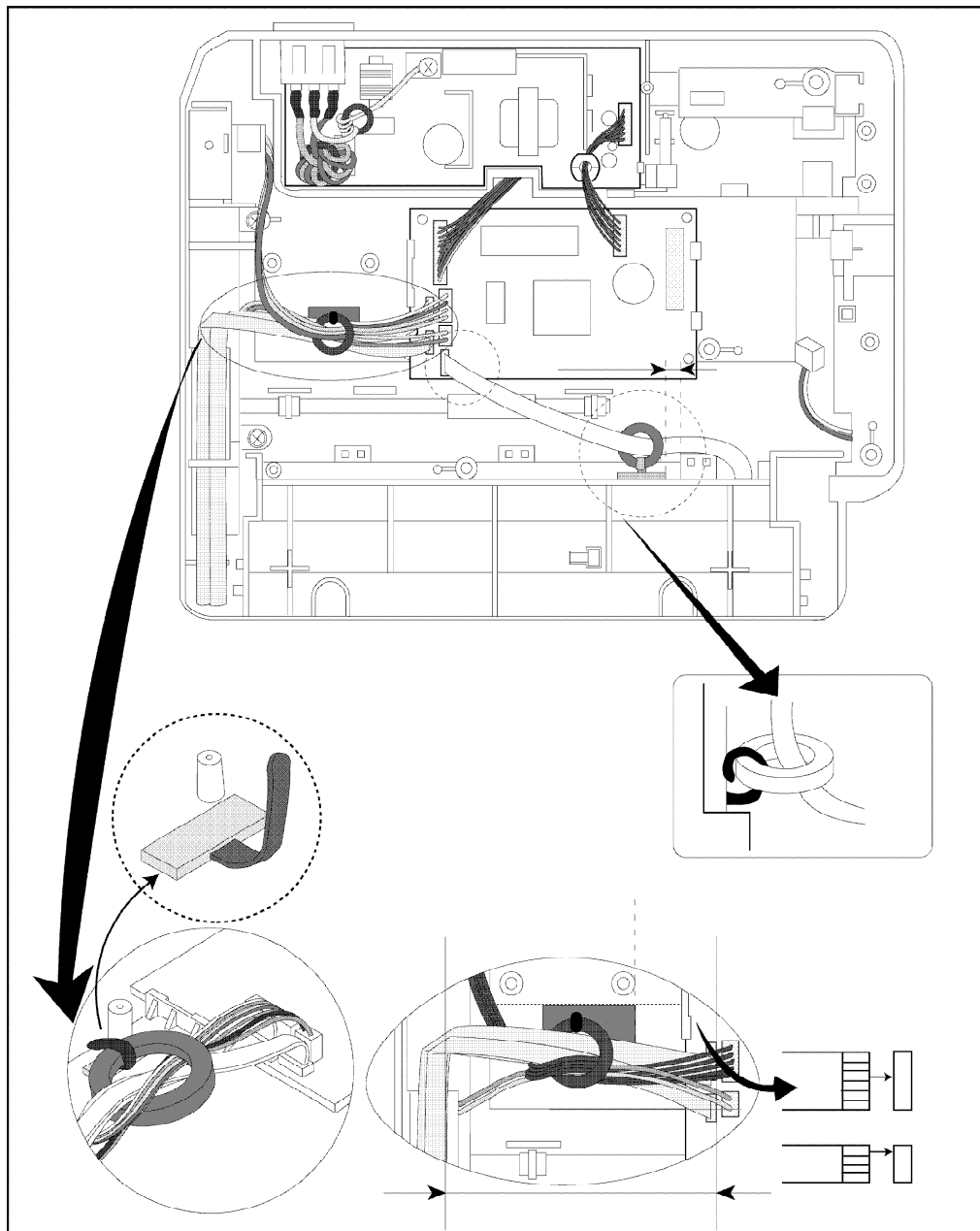
Procedure: 10

REF No. 10

- 1) Push the cover open button in the direction of the arrow to open the operation block.
- 2) Remove the Head Cover with a screwdriver as shown in Fig. A.
- 3) Remove the 2 connectors.
- 4) Remove the Thermal Head as shown in Fig. B.
- 5) Remove the Lock Lever as shown in Fig. C.



3.11. INSTALLATION POSITION OF THE LEAD WIRES



4. HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example: SPOT HEATER) to remove the SPOT HEATER'S Flat IC, if you have solder (large amount), a soldering iron, and a cutter knife, you can easily remove the ICs even if there are more than 100 pins.

4.1. PREPARATION

- SOLDER

Sparkle Solder 115A-1, 115B-1 OR Almit Solder KR-19, KR-19RMA

- Soldering iron

Recommended power consumption is between 30 W to 40 W. / Temperature of Copper Rod $662 \pm 50^{\circ}\text{F}$ ($350 \pm 10^{\circ}\text{C}$) / (An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)

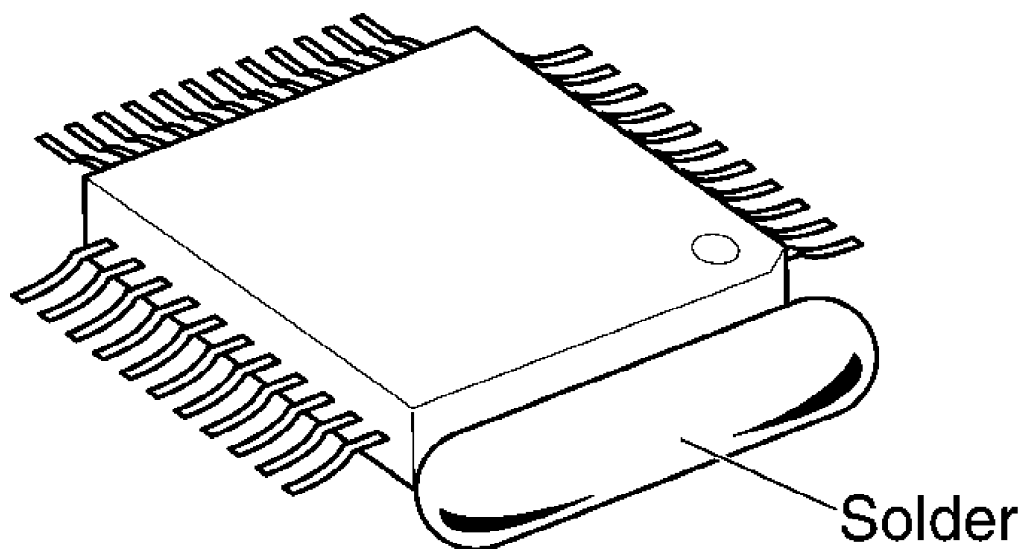
- Flux / HI115 Specific gravity 0.863 / (Original flux should be replaced daily.)

4.2. FLAT PACKAGE IC REMOVAL PROCEDURE

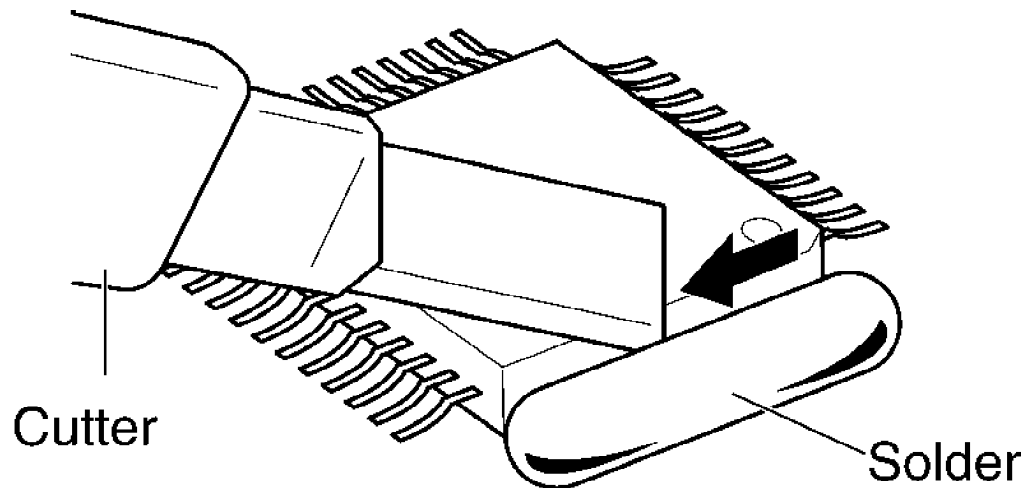
1. When all of the IC lead cannot be seen at the standard degree, fill with large quantities of solder.

Note:

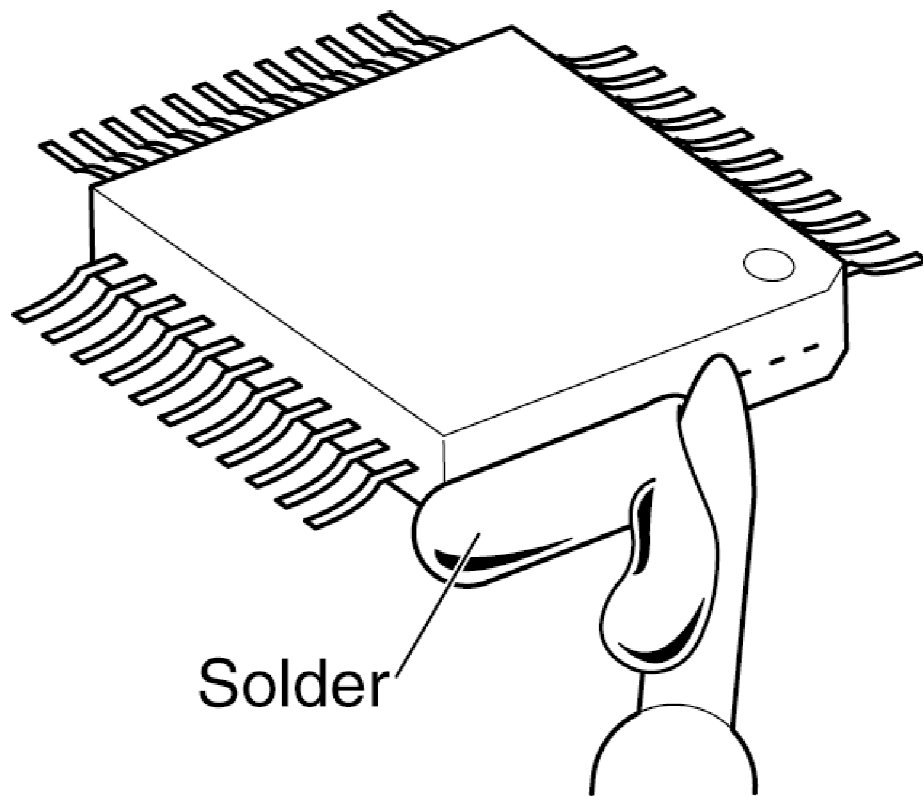
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C. board's pattern. If you do not fill with large quantities of solder as in step 1, the P.C. board pattern may be removed.



2. Using a cutter, cut the lead at the source. (Cut the contents with a cutter lightly, 5 or 6 times.)



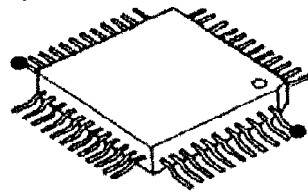
3. Remove when the solder melts. (Remove the lead at the same time.)



After removing the Flat IC and when attaching a new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly

4.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

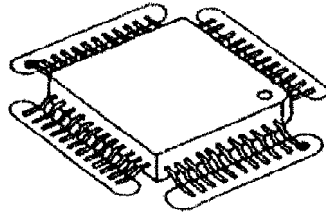
- 1) Temporarily fix the FLAT PACKAGE IC by soldering on the two marked pins.



● ————— Temporary soldering point.

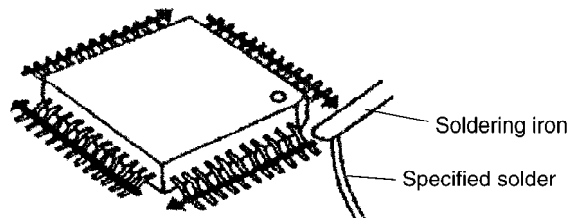
*Check the accuracy of the IC setting with the corresponding soldering foil.

- 2) Apply flux to all pins of the FLAT PACKAGE IC.



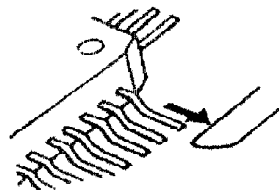
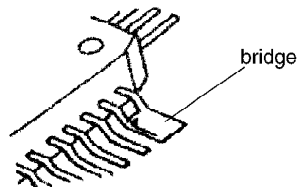
————— Flux

- 3) Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.



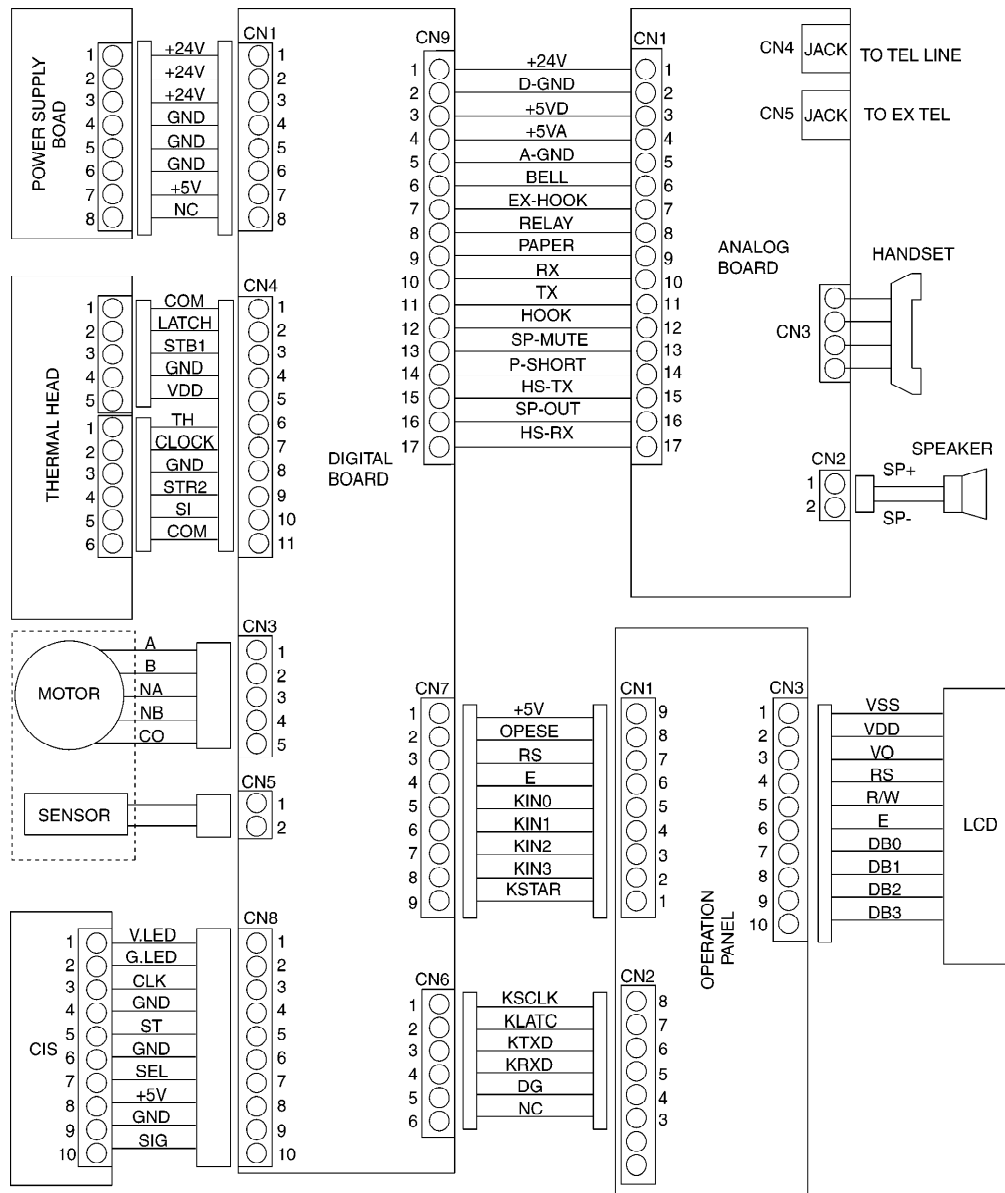
4.4. BRIDGE MODIFICATION PROCEDURE

- 1) Lightly re-solder the bridged portion.
- 2) Remove the remaining solder along the pins using a soldering iron as shown in the figure below.



5. CIRCUIT OPERATIONS

5.1. CONNECTION DIAGRAM



5.2. GENERAL BLOCK DIAGRAM

The control section will be explained as shown in the block diagram.

1. ASIC (IC1)

Composed mainly of an address decoder, modem control section, CPU and RTC.

Controls the general FAX operations.

Controls the operation panel I/F.

Controls the thermal head I/F and CIS I/F.

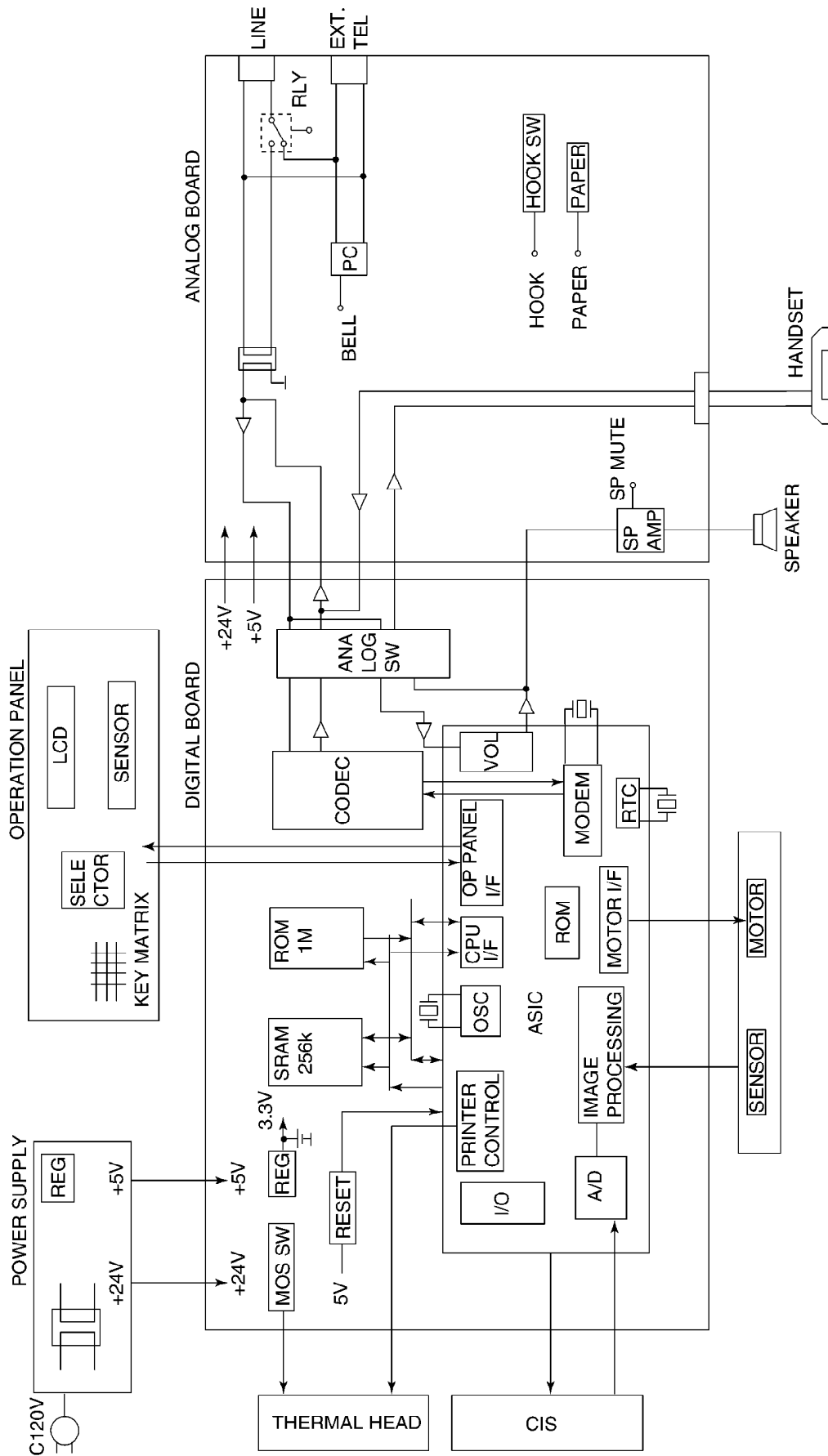
Executes image processing.

Monitors the H/S volume.

I/O ports

- 2. ROM (IC2)**
Contains all of the program instructions for unit operations.
- 3. Static RAM (IC3)**
This memory is used mainly for the parameter working storage area.
- 4. MODEM (Incruded in IC1)**
Modem for the FAX.
- 5. Read Section**
Contact Image Sensor (CIS) to read transmitting documents.
- 6. Thermal Head**
Contains heating elements for dot matrix image printing.
- 7. Motor driver (IC7)**
Drives the motor.
- 8. Reset circuit (IC4)**
Provides a reset pulse to each of the major ICs.
- 9. Analog board**
Composed of an ITS circuit and NCU circuit.
- 10. Sensor Section**
Composed of a document sensor, recording paper sensor, motor position sensors, read position sensor.
- 11. Power supply switching board section**
Supplies +5V and +24V to the unit.
- 12. CODEC (IC5)**
A/D and D/A converter.

5.2.1. General Block Diagram



5.3. CONTROL SECTION

5.3.1. BLOCK DIAGRAM

5.3.2. ASIC (IC1)

This custom IC is used for general FAX operations.

1. CPU

This model uses a Z80 equivalent CPU operating at 8MHz. / Many of the peripheral functions are handled by custom designed LSIS. As a result, the CPU only needs to process the result.

2. RTC

Real time clock.

3. DECODER

Decodes the address.

4. MODEM

Execute modulation and demodulation for the FAX.

5. ROM/RAM I/F

Controls the SELECT signal of ROM or RAM and bank switching.

6. CIS I/F

Controls document reading.

7. IMAGE DATA RAM

This is inside the ASIC and has 8KB which is used for image processing.

8. THERMAL HEAD I/F

Transmits the recorded data to the thermal head.

9. MOTOR I/F

Controls the motor which feeds the document and feeds the reading document.

10. OPERATION PANEL I/F

Serial interface with Operation Panel.

11. I/O PORT

I/O Port Interface (for analog board port control).

12. ANALOG UNIT

Electronic volume for the handset and monitor. / Sends beep

tones, etc.

Explanation of the Pin Distribution (IC1)

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
1	X32OUT	VDDRTC	-	X32OUT		32.768kHz oscillator for RTC (b feed back resistor)
2	X32IN	VDDRTC	NO	X32IN		32.768kHz oscillator for RTC (b feed back resistor)
3	VDDRTC			+3.3V/ BATT		32.768kHz backup power suppl
4	XBACKEN	VDDRTC	YES	XRESET		Backup enable
5	VDDSRAM			+3.3V/ BATT		RAMCS buffer/backup power s reset
6	XRAMCS	VDDSRAM	-	VDDSRAM		SRAM chip select ("H": 3.3V or
7	XRAMCE2/ ALARM	VDDSRAM	-	OPEN		Not used
8	FTG	MULT3/5	NO	FTG	O	FTG
9	F1	MULT3/5	NO	F1	O	F1 (50%/75% selector)
10	MULT3/5			+5V		Power supply
11	VSS			DG		Ground
12	F2/OP50	MULT3/5	NO	E	O	LCD control
13	FR/OP51	MULT3/5	NO	OPEN	O	Not used
14	XRESET	3.3V	YES	XRESET		Reset input for internal digital c
15	VSS			DG		Ground
16	XORESET	3.3V	-	XORESET		Reset output
17	XRESETI	3.3V	YES	XRESETI		Voltage detector IC output for r
18	XWDERR	3.3V	YES	XWDERR		Watch dog timer error
19	XRSTSWO/ OP82	3.3V	YES	OPEN	O	Not used
20	VIDRST/IOP20	3.3V	YES	OPEN	O	Not used
21	SPHCLK/IOP21	3.3V	YES	OPEN	O	Not used
22	DARKON/IOP22	3.3V	YES	OPEN	O	Not used
23	ADSEL2/IOP23	3.3V	YES	OPEN	O	Not used
24	BELL/OP	3.3V	YES	OPEN	O	Not used
25	3.3V			+3.3V		Power supply
26	IRDATXD/IOP81	3.3V	YES	OPEN	O	Not used
27	IRDARXD/ IOP80	3.3V	YES	OPEN	O	Not used
28	TXD/IOP30	3.3V	YES	BREAK	O	TEL Line Break Control
29	RXD/IOP31	3.3V	YES	H/S ALC	I	Not used (Hardware Control)
30	XRTS/IOP32	3.3V	YES	DTMF IMP	O	DTMF-IMP Control
31	XCTS/IOP33	3.3V	YES	P-SHORT	O	P-SHORT Control (Not Used)
32	XDSR/IOP34	3.3V	YES	OPEN	O	Not used
33	DCD/IOP35	3.3V	YES	OPEN	O	Not used
34	XDTR/IOP36	3.3V	YES	OPEN	O	Not used

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
35	RI/CLK/IOP37	3.3V	YES	OPEN	O	Not used
36	IOP90	3.3V	YES	OPEN	O	Not used
37	IOP91	3.3V	YES	OPEN	O	Not used
38	VSS			DG		Ground
39	IOP92	3.3V	YES	OPEN	O	Not used
40	IOP93	3.3V	YES	OPEN	O	Not used
41	IOP94	3.3V	YES	OPEN	O	Not used
42	IOP95	3.3V	YES	OPEN	O	Not used
43	3.3V			+3.3V		Power supply
44	FMEMCS/IOP27	3.3V	YES	OPEN	O	Not used
45	FMEMDO/IOP26	3.3V	YES		I	Not used
46	FMEMDI/IOP25	3.3V	YES		O	Not used
47	FMEMCLK/IOP24	3.3V	YES	TELRXENB	I/O	Telephone RX root control
48	CBUSY2	3.3V	-	OPEN		Not used
49	CSO/OP70	3.3V	-	OPEN		Not used
50	CBUSY1	3.3V	YES	OPEN		Not used
51	CCLK	3.3V	YES	OPEN		Not used
52	CSI	3.3V	YES	OPEN		Not used
53	MIDAT/IOP45	MULT3/5	YES	MTXENB	O	Modem TX route control
54	MICLK/IOP46	MULT3/5	YES	MOMRXENB	O	Modem RX route control
55	MILAT/IOP47	MULT3/5	YES	H/SRXENB	O	Handset RX route control
56	RVN	3.3V	YES	BELL		Bell signal detection
57	CPC	3.3V	YES	PAPER		Recording paper detection
58	TONE1	3.3V	-	TONE1		Not used
59	TONE2	3.3V	-	TONE2		Tone2 (bell alarm key tone)
60	VSS			DG		Ground
61	3.3V			+3.3V		Power supply
62	EVOLIN	(3.3V)	-	EVOL IN		Electronic volume (handset mo
63	EVOLOUT	(3.3V)	-	EVOL OUT		Electronic volume (handset mo
64	EVOLREF	(3.3V)	-	EVOL REF		Electronic volume (handset mo
65	VSS			DG		Ground
66	IOP57	3.3V	YES	EX-HOOK	O	Not used
67	XMDMINT	3.3V	YES	XINTMDM		Modem interrupt
68	XINTMDM	3.3V	-	XMDMINT		Modem INT output/general outp
69	XNMI/XINT	3.3V	YES	XNMI		NMI
70	EYECKO	MULT3/5	NO	EYECKO		Modem AFE connection (APDM
71	APDMDT	3.3V	YES	APDMDT		Modem AFE connection
72	C3	MULT3/5	NO	C3		Modem AFE connection
73	C4	MULT3/5	NO	C4		Modem AFE connection
74	C5	MULT3/5	NO	C5		Modem AFE connection
75	MULT3/5			+5V		Power supply
76	DPDMDT	MULT3/5	NO	DPDMDT		Modem AFE connection
77	DPDMCK	MULT3/5	NO	DPDMCK		Modem AFE connection

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
78	MUTE	MULT3/5	NO	MUTE		Modem AFE connection
79	XEYESYC	MULT3/5	NO	XEYESYC		Modem eye pattern EYESYNC
80	EYEDAT	MULT3/5	NO	EYEDAT		Modem eye pattern EYEDAT
81	XRESETD	MULT3/5	NO	XRESETD		Modem AFE connection
82	CPUCK	3.3V	-	CPUCK		CPU clock (6MHz) output
83	XHOLDAK	3.3V	-	OPEN		Not used
84	XWAIT/IP60	3.3V	YES	HOOK		Hook detection
85	XHOLD/IP61	3.3V	YES	PULL DOWN		Not used
86	XHSTRD/IOP40	3.3V	YES	H/S MUTE	O	Handset TX mute
87	VSS			DG		Ground
88	XINMDM	3.3V	NO			20.736MHz crystal oscillator bu
89	XOUTMDM	3.3V	-			20.736MHz crystal oscillator bu
90	TEST1	3.3V	NO	+3.3V		Test pin. fixed High
91	TEST2	3.3V	NO	+3.3V		Test pin. fixed High
92	XTEST	3.3V	-	XTEST		24MHz clock output
93	TEST3	3.3V	NO	+3.3V		Test pin. fixed High
94	XOUT	3.3V	-	XOUT		24MHz oscillator
95	XIN	3.3V	NO	XIN		24MHz oscillator
96	VSS			DG		Ground
97	3.3V			+3.3V		Power supply
98	TEST4	3.3V	NO	+3.3V		Test pin. fixed High
99	XHSTWR/IOP41	3.3V	YES	RLY	O	Tel line relay control
100	XOPRBE/MUX/OP53	3.3V	-	SP-MUTE		Speaker mute control
101	XRAS/IOP42	3.3V	NO	OPEN	O	Not used
102	XCAS1/IOP43	3.3V	NO	OPEN	O	Not used
103	XCAS2/IOP44	3.3V	NO	OPEN	O	Not used
104	DB3	3.3V	YES	D3		Data bus
105	DB2	3.3V	YES	2		Data bus
106	DB4	3.3V	YES	4		Data bus
107	DB1	3.3V	YES	1		Data bus
108	DB5	3.3V	YES	5		Data bus
109	DB0	3.3V	YES	0		Data bus
110	DB6	3.3V	YES	6		Data bus
111	DB7	3.3V	YES	D7		Data bus
112	XROMCS	3.3V	-	XROMCS		ROM chip select
113	XRD	3.3V	-	/RD		Read signal output
114	3.3V			+3.3V		Power supply
115	XWR	3.3V	-	/WR		Write signal output
116	ADR0	3.3V	-	A0		Address bus
117	ADR1	3.3V	-	1		Address bus
118	ADR2	3.3V	-	2		Address bus
119	VSS			DG		Ground

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
120	ADR3	3.3V	-	3		Address bus
121	ADR4	3.3V	-	4		Address bus
122	ADR5	3.3V	-	5		Address bus
123	ADR6	3.3V	-	6		Address bus
124	ADR7	3.3V	-	7		Address bus
125	ADR8	3.3V	-	8		Address bus
126	ADR9	3.3V	-	9		Address bus
127	ADR10	3.3V	-	10		Address bus
128	VSS			DG		Ground
129	3.3V			+3.3V		Power supply
130	ADR11	3.3V	-	11		Address bus
131	ADR12	3.3V	-	12		Address bus
132	RBA0	3.3V	-	A13		Bank address
133	RBA1	3.3V	-	14		Bank address
134	RBA2	3.3V	-	15		Bank address
135	RBA3	3.3V	-	16		Bank address
136	RBA4	3.3V	-	17		Bank address
137	RBA5/OP	3.3V	-	18		Not used
138	RBA6/IOP	3.3V	NO	19	O	Not used
139	XRESCS1/OP72	3.3V	-	OPEN		Not used
140	XRESCS2/OP71	3.3V	-	OPEN		Not used
141	XMDMCS/OP	3.3V	-	OPEN		Not used
142	VSS			DG		Ground
143	XRESCS3/OP52	3.3V	-	OPEN		Not used
144	20KOSC/IOP56	3.3V	YES	OPEN	O	Not used
145	ADR13	3.3V	-	OPEN		Not used
146	ADR14	3.3V	-	OPEN		Not used
147	3.3V			+3.3V		Power supply
148	ADR15	3.3V	-	OPEN		Not used
149	RM0/IOP00	3.3V	YES	T5	O	Motor control
150	RM1/IOP01	3.3V	YES	T4	O	Motor control
151	RM2/IOP02	3.3V	YES	T3	O	Motor control
152	RM3/IOP03	3.3V	YES	T2	O	Motor control
153	RXE/IP04	3.3V	YES	T0	O	Motor control
154	TM0/IOP10	3.3V	YES	LEDON	O	CIS LED control
155	TM1/IOP11	3.3V	YES	OPEN	O	Not used
156	TM2/IOP12	3.3V	YES	OPEN	O	Not used
157	TM3/IOP13	3.3V	YES	OPEN	O	Not used
158	TXE/IP14	3.3V	YES	PULL DOWN	I	Pull down
159	STB1	MULT3/5	NO	STB1	O	Thermal head strobe 1
160	STB2	MULT3/5	NO	STB2	O	Thermal head strobe 2
161	STB3	MULT3/5	NO	OPEN	O	Not used
162	STB4	MULT3/5	NO	OPEN	O	Not used

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
163	THDAT	MULT3/5	NO	TH DATA	O	Thermal data
164	VSS			DG		Ground
165	MULT3/5	-		+5V		Power supply for THCLK DAT I
166	THCLK	MULT3/5	NO	TH CLK	O	Thermal head clock
167	THLAT	MULT3/5	NO	TH LAT	O	Thermal head latch
168	STBNP	3.3V	YES	CIS SEL		
169	3.3V			+3.3V		Power supply
170	TXD2/IOP	3.3V	YES	TH ON	O	Thermal head 24V ON
171	RXD2/IOP	3.3V	YES	RS	I/O	LCD control
172	RTS2/IOP	3.3V	YES	OPEN	O	Not used
173	CTS2/IOP	3.3V	YES	CIS ON	O	CIS 5v supply control
174	DSR2/IOP	3.3V	YES	MOTOR PO.	I	Motor position detection
175	DCD2/IOP	3.3V	YES	OPEN	O	Not used
176	DTR2/IOP	3.3V	YES	OPEN	O	Not used
177	RI2/IOP	3.3V	YES	OPEN	O	Not used
178	XRSTSW/IP83	3.3V	YES	PULL DOWN		Pull down
179	KEYIN0	3.3V	YES	KIN0	I/O	Key read
180	KEYIN1	3.3V	YES	KIN1	I/O	Key read
181	KEYIN2	3.3V	YES	KIN2	I/O	Key read document sensor con
182	KEYIN3	3.3V	YES	KIN3	I/O	Key read read start position se
183	KEYIN4	3.3V	YES	OPEN	O	Not used
184	KEYIN5	3.3V	YES	OPEN	O	Not used
185	OPLED	3.3V	YES	OPESEL	OD	Operation panel control
186	VSS			DG		GND
187	3.3V			3.3V	OD	Power supply
188	KSTART	3.3V	YES	KSTART	OD	LCD control
189	KLATCH	3.3V	YES	KLATCH	OD	Key scan LCD control
190	KSCLK	3.3V	YES	KSCLK	OD	Key scan LCD control
191	KTXD	3.3V	YES	KTXD	I	Key scan LCD control
192	KRXD	3.3V	YES	KRXD	O	Document read start position s
193	ADSEL1	3.3V	YES	ADSEL1		Thermal head temperature dete
194	VSSC			DG		Ground for analog image proce
195	VREFB	Analog	-	VREFB		A/D reference-
196	VREFT	Analog	-	VREFT		A/D reference+
197	BIAS	Analog	-	BIAS		
198	VREFH	Analog	-	VREFH		A/D reference center
199	VDDC			+3.3V		Power supply for analog image
200	VSSA			DG		Ground for analog image proce
201	VDDA			+3.3V		Power supply for analog image
202	Vddb			+3.3V		Power supply for analog image

Pin	Pin Name	Buffer Power supply	5V Tolerant	Signal Name	I/O	Description
203	VCL	Analog	-	VCL		Clamp level
204	AIN3	Analog	-	AIN3		
205	AIN1	Analog	-	AIN1		Analog image signal (CIS output input)
206	AMON	Analog	-	OPEN		Not used
207	AIN2	Analog	-	AIN2		Thermistor voltage detection
208	VSSB			DG		Ground for analog image process

5.3.3. ROM (IC2)

This 128 KB ROM (OTPROM or MASKROM) has 32 KB of common area and bank area (BK4~BK15). / The capacity of each bank is 8 KB. / The addresses of the common area are from 0000H to 7FFFH, and addresses 8000H to 9FFFH are for the bank area.

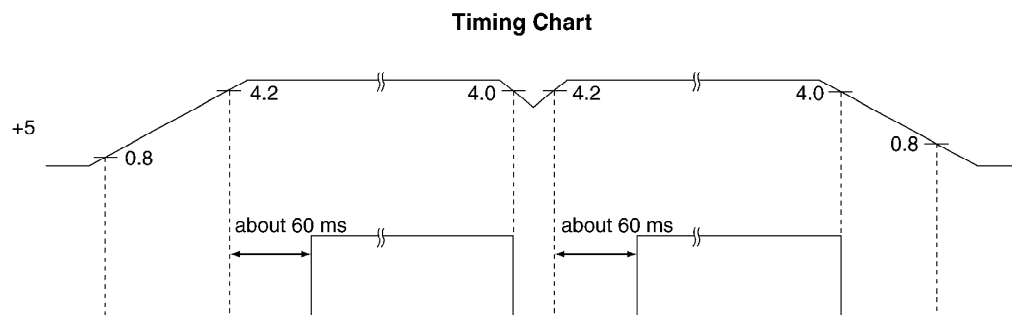
5.3.4. RAM (IC3)

This 32 KB RAM has 8 KB of common area and bank area (BK0, BK1). / The capacity of each bank is 12 KB. / The addresses of the common area are from D000H to EFFFH, and addresses A000H to CFFFH are for the bank area.

5.3.5. RESET CIRCUIT

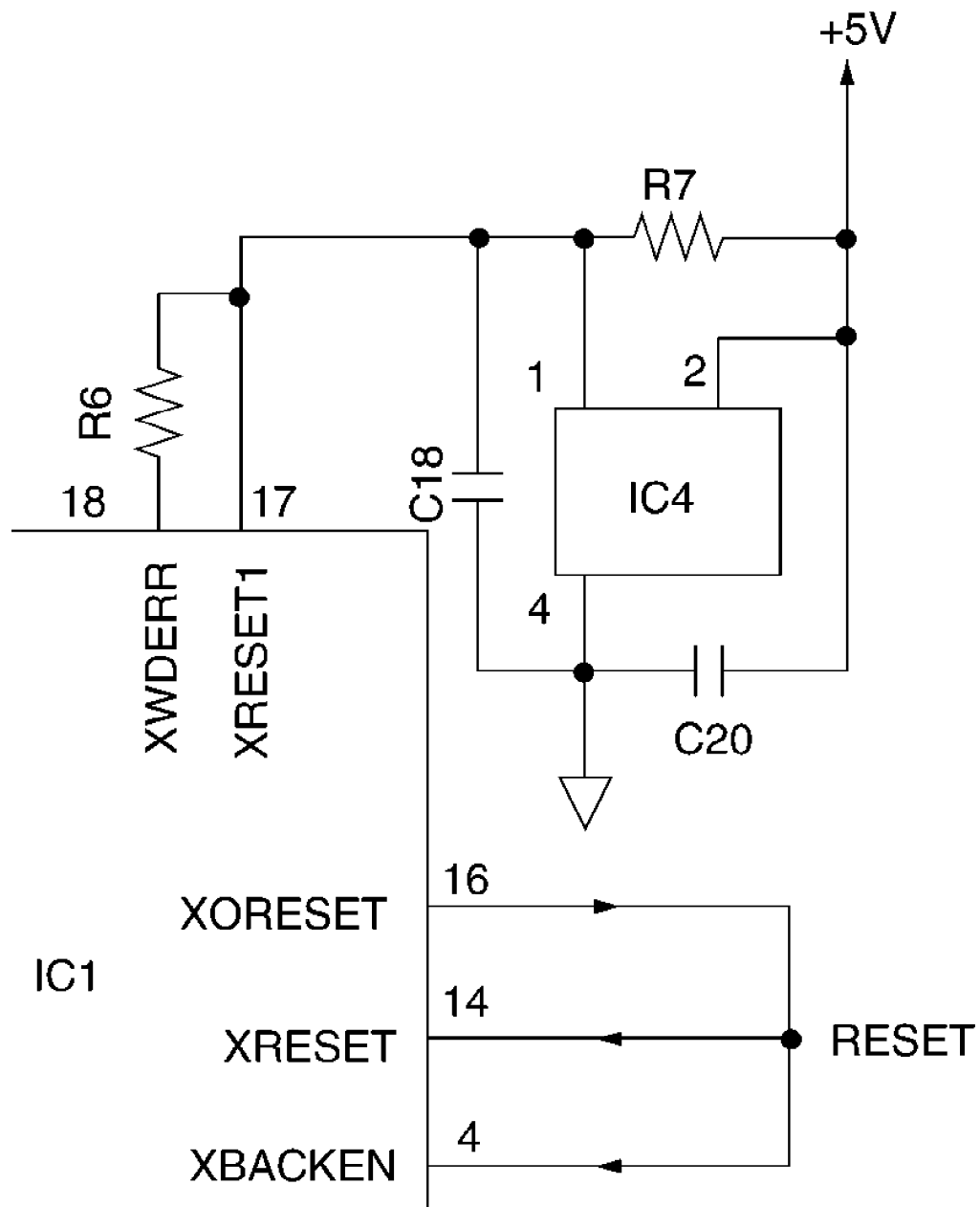
The output from pin 1 of the Reset IC (IC4) resets the gate array (IC1).

During a power surge, a positive reset pulse of 175 msec or more is generated and the system is reset completely. / This is done to prevent partial resetting and system runaway during a power fluctuation.



When pin 1 of IC4 becomes low, it will prohibit the RAM (IC3) from changing data. / The RAM (IC3) will go into the backup mode, when it is backed up by a lithium battery.

Circuit Diagram



The watch dog timer, built-in the gate array (IC1), is initialized about every 1.5 ms. / When a watch dog error occurs, pin 18 of the gate array (IC1) becomes low. / The terminal of the $\overline{\text{WDERR}}$ signal is connected to the reset line so the $\overline{\text{WDERR}}$ signal works as the reset signal.

5.3.6. SRAM and RTC BACK UP CIRCUIT

1. Function

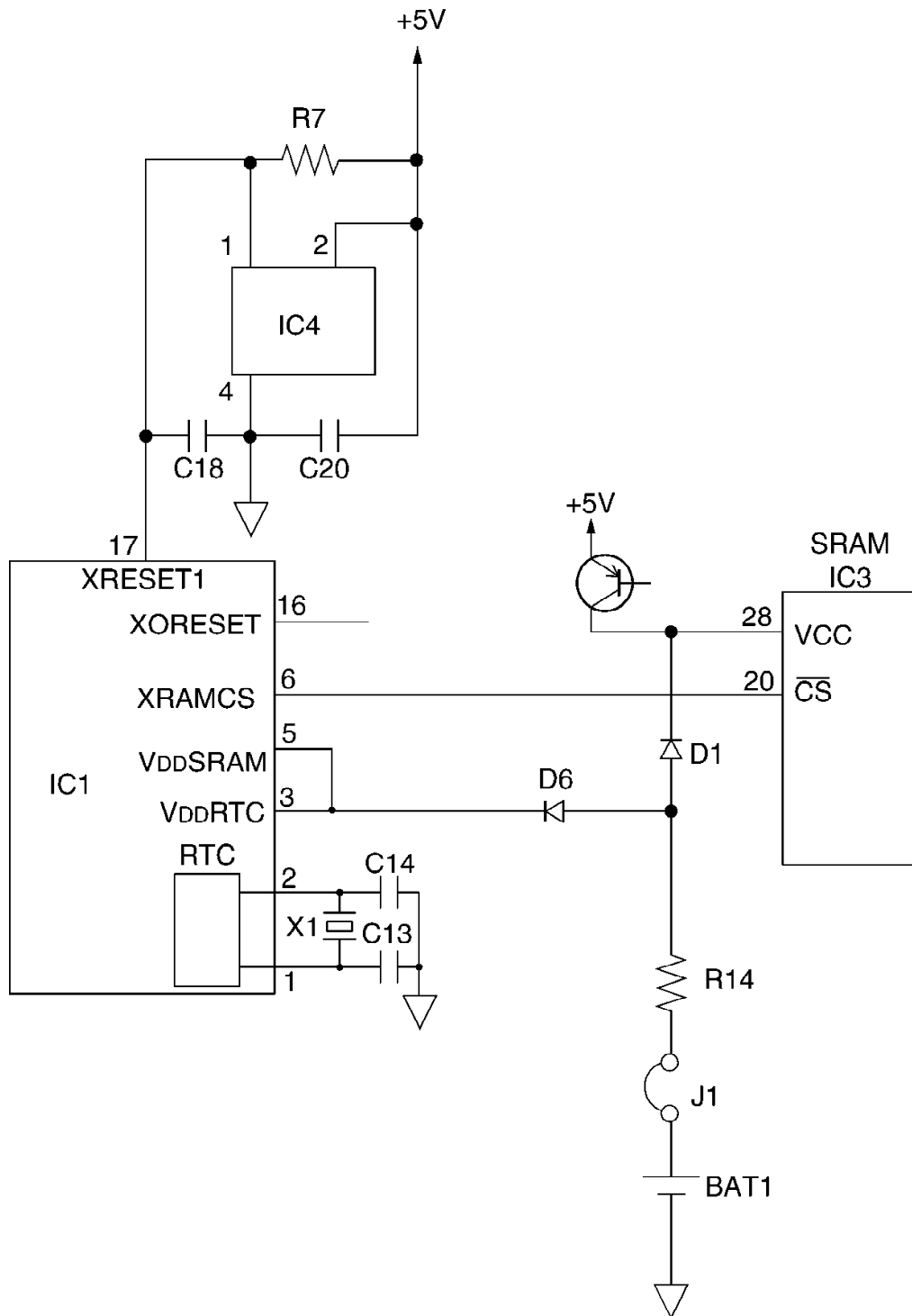
This unit has a lithium battery (BAT1) which works for the RAM (IC3) and Real Time Clock (RTC, Integrated into ASIC:IC1). / The user parameter for auto dial numbers, the transmission ID, the

system setup date and so on are stored in the RAM (IC3). / The RTC continues functioning, even when the power switch is OFF, backed up by a lithium battery.

2. Circuit Operation

When the power is turned ON, power is supplied RAM (IC3) and RTC (IC1). / At this time, the voltage at pin 28 of RAM is +5V and pin 3 of RTC (IC1) is +3.3V. When the power is turned OFF, the battery supplies the power to RAM and RTC through J1, R14,D1 or D7. At that time, the voltage at pin 28 of RAM and pin 3 of IC1 are about +2.5V. When the power is OFF and the +5V and +3.3V voltages decrease, IC4 detects them and LOW is input to pin 17 of IC1. Pin 16 of IC1 outputs the reset signals. Pin 28 of RAM (IC3) and pin 3 of RTC (IC1) become low, then RAM and RTC (IC1) go into the back up mode, when the power consumption is lower.

Circuit Diagram



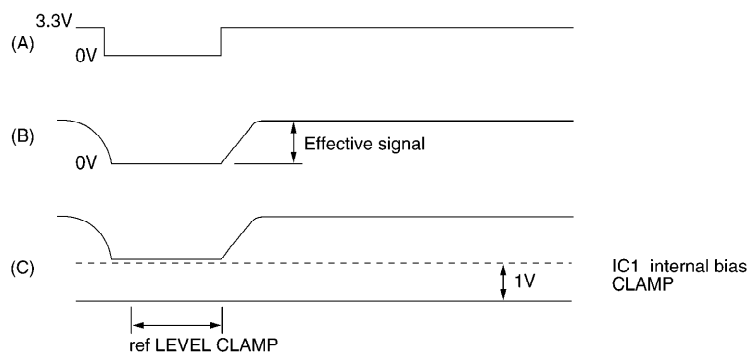
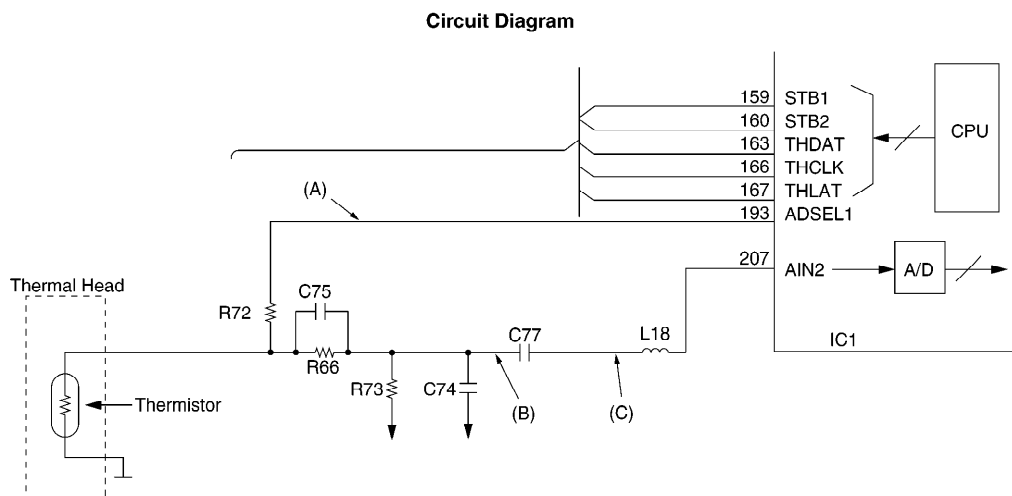
5.3.7. SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE

1. Function

The thermistor changes the resistor according to the temperature and uses the thermistor's characteristics. / The output of pin 193

of IC1 becomes a low level. / Then when it becomes a high level, it triggers point (A). / In point (C), according to the voltage output time, the thermal head's temperature is detected.

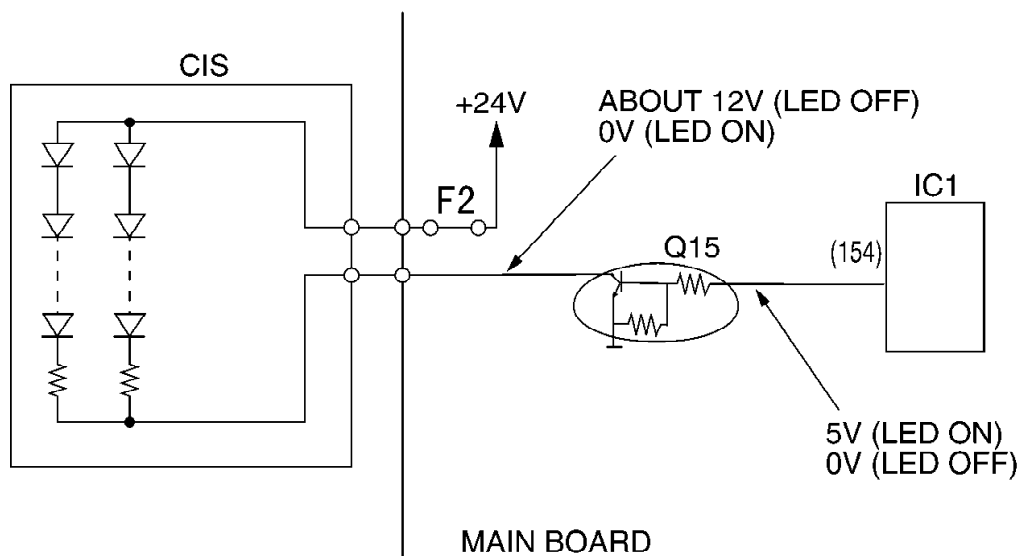
After the thermal head temperature is converted to voltage in (B), it is then changed to digital data in the A/D converter inside IC1. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.



5.3.8. LED ARRAY(CIS)

The LED ARRAY will light during transmission and copying as a light source to recognize document characters, patterns, or graphics on a document. / It is also possible to light the LED ARRAY in the test mode.

Circuit Diagram



5.4. FACSIMILE SECTION

5.4.1. IMAGE DATA FLOW DURING FACSIMILE OPERATION

COPY (Fine, Super-Fine, Half Tone)

1. Line information is read by CIS, via route (1), and is input to IC1.
2. In IC1, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route (2) it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route (3). Then via routes (4) and (5), it is stored in RAM as shading data.
3. The draft's information that is read by CIS is input to IC1 via route (1). After it is adjusted to a suitable level for A/D conversion via route (2), the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. / The other side, the shading data which flows from RAM via routes (6) and (7), is input to the Image Processing Section. / After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". / Then via routes (4) and (5), they are stored in RAM.
4. The white/black data stored as above is input to the P/S converter via routes (6) and (8). / The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route (9) and is printed out on recording paper.

Note:

Standard: Reads 3.85 times/mm

Fine: Reads 7.7 times/mm

Super-Fine: Reads 15.4 times/mm

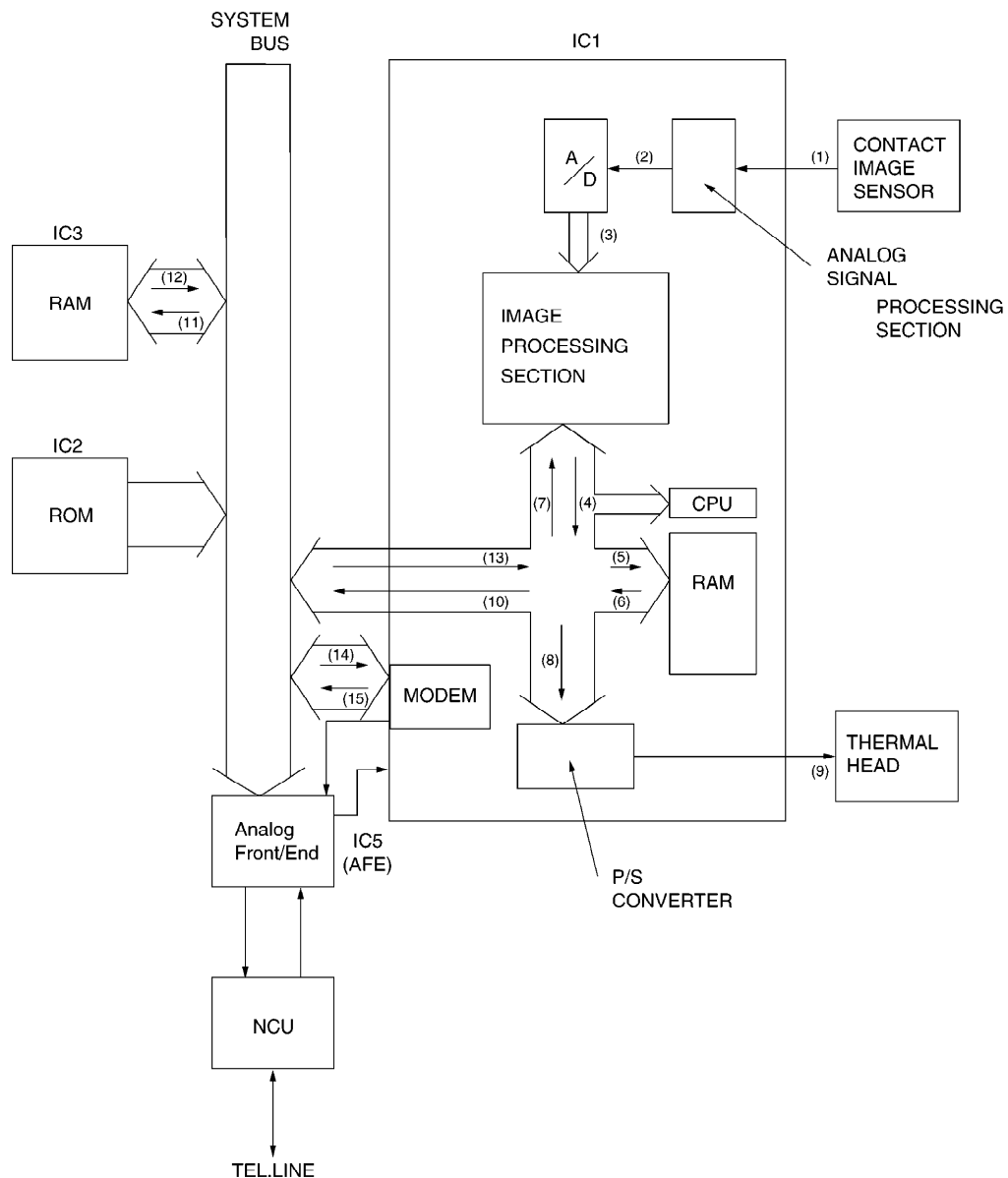
Transmission

- 1. Same processing as COPY items 1) - 3).**
- 2. The data stored in RAM of IC1 is output from IC1 via routes (6) and (10), and is stored in the system bus. / Via route (11), it is stored in the communication buffer inside RAM (IC3).**
- 3. While fetching data stored in the communication buffer synchronous with the modem, the CPU inputs data to the modem along route (12) and (14). / In the analog front end IC (IC5) it is converted to serial analog data and forwarded over telephone lines via the NCU Section.**

Reception

- 1. The serial analog image data is received over telephone lines and input to the analog front end IC (IC5) via the NCU section, where it is demodulated to parallel digital data. The balance data is sent to the modem. Then the CPU stores the data in the communication buffer of RAM (IC3) along route (11) and (15).**
- 2. The data stored in RAM (IC3) is decoded by the CPU via route (12), and is stored in RAM by routes (13) and (5).**
- 3. Same processing as COPY item 4).**

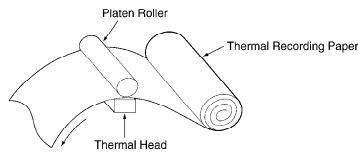
5.4.2. BLOCK DIAGRAM



5.4.3. THERMAL HEAD

1. Function

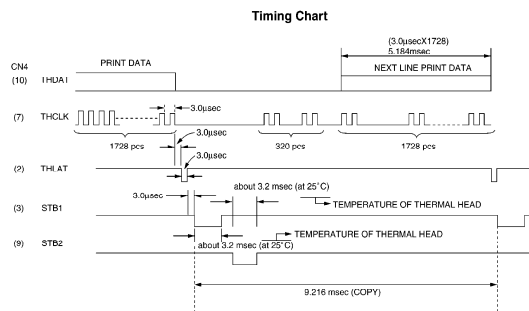
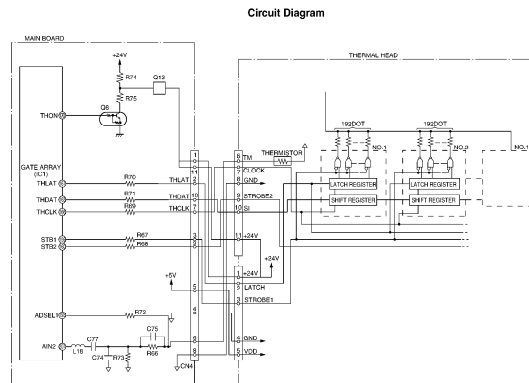
This unit utilizes state of the art thermal printer technology. / The recording paper (roll paper) is chemically processed. When the thermal head contacts this paper it emits heat momentarily, and black dots (appearing like points) are printed on the paper. If this continues, letters and/or diagrams appear, and the original document is reproduced.



2. Circuit Operation

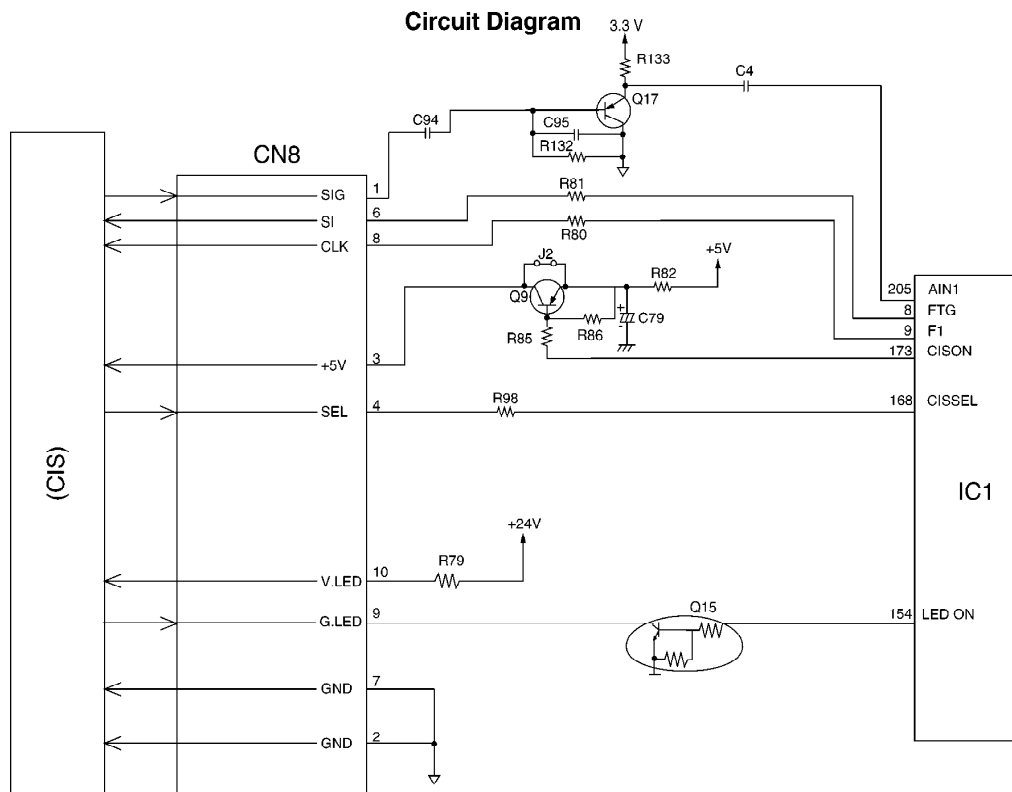
There are 9 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 192 heat emitting registers. This means that one line is at a density of $192 \times 9 = 1728$ dots $= (8 \text{ dots/mm})$. / White/Black (white=0, black=1) data in one line increments is synchronized at IC1 pin 166 (THCLK), and sent from IC1 pin 163 (THDAT) to the shift register of the ICs. The shift registers of the 9 ICs are connected in series, and upon the shift of dot increment 1728, all the shift registers become filled with data, and a latch pulse is emitted to each IC from IC1 pin 167 (THLAT).

With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC1 pins (159, 160) only black dot locations (=1) among latched data activates the driver, and the current passes to heat the emitting body causing heat emission. / Here, the three line strobes, STB1 to STB2, impress at intervals of 9.216 msec, as required for one-line printout. / The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC1 pin 207. (See **BLOCK DIAGRAM** (.)) Depending on that value, the strobe width is recorded in ROM (IC2). / Accordingly, the strobe width is determined. / When the thermal head is not used, the IC1 (170, THON) becomes low, Q8 turns OFF, Q13 turns OFF, and the +24 V power supply for the thermal head driver is not impressed to protect the IC.



5.4.4. SCANNING BLOCK

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED array, and photoelectric conversion elements.



When an original is inserted and the start button pressed, pin 154 of IC1 goes to a high level and the transistor inside IC7 turns on. This applies voltage to the LED array to light it. The contact image sensor is driven by each of the FTG-F1 signals output from IC1, and the original image

illuminated by the LED array undergoes photoelectric conversion to output an analog image signal (AIN). The analog image signal is input to the system LSI (IC1) on ANA1 (pin 205 of IC1) and converted into 8-bit data by the A/D converter inside IC1. Then this signal undergoes digital processing in order to obtain a high-quality image.

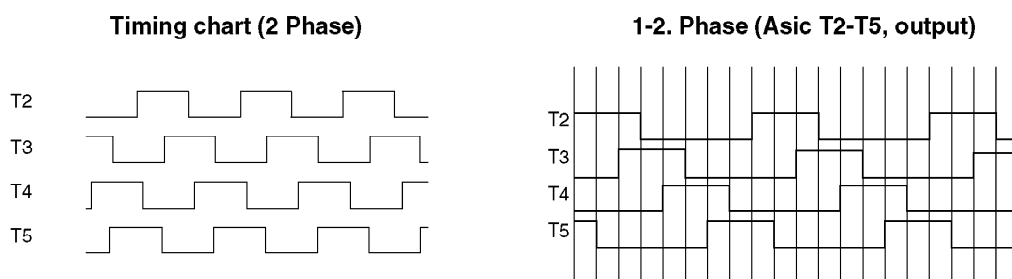
5.4.5. STEPPING MOTOR DRIVE CIRCUIT

1. Function

One individual stepping motor is used for transmission and reception. It feeds the document or recording paper synchronized for reading or printing.

2. Circuit Operation

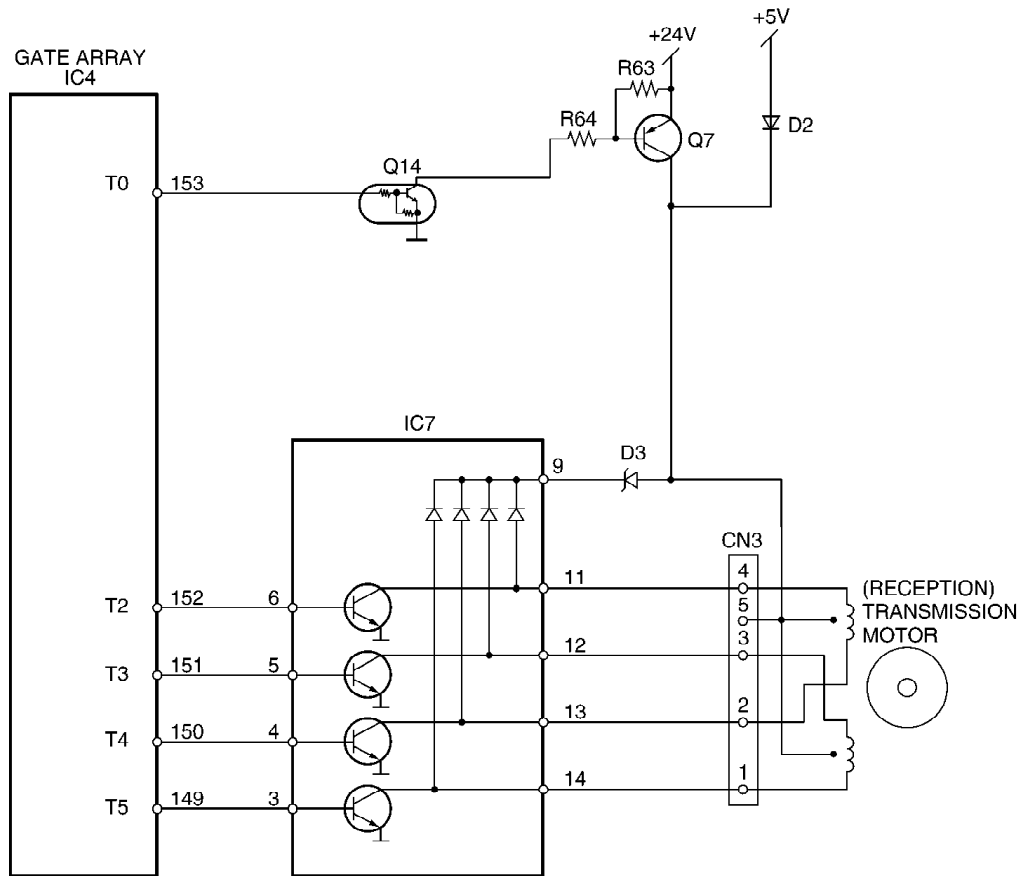
During motor drive, gate array IC1 pin 153 becomes a high level, and Q14 and Q7 go ON as a result. +24 V is supplied to the motor coil. / Stepping pulses are output from gate array IC1, causing driver IC7 to go ON. The motor coil is energized sequentially in 2 phase increments or 1-2 phase increments, which causes a 1-step rotation. A 1-step rotation is 0.13mm of recording paper or document paper. The timing chart is below.



Stepping Motor Phase Pattern

Function	Mode	Phase Pattern	Speed
Copy	Fine/Half Tone	1-2	217 pps
	Super Fine	1-2	108.5 pps
FAX	STD	2	217 pps
	Fine/Half Tone	1-2	217 pps
	Super Fine	1-2	108.5 pps
——	Paper Feed	2-2	434 pps

Circuit Diagram



When the motor is OFF, gate array IC1 pin 153 becomes a low level and Q14 and Q7 also turns OFF. Instead of +24V, +5V is supplied through D2 so that the motor is held in place.

5.4.6. GEAR SECTION

This section shows how the motor-driven gear mechanism works in the main operations: FAX transmission, FAX reception the motor and copying.

5.4.6.1. MODE SELECTION

When the motor attached to the Drive Motor Gear rotates counterclockwise (CCW), Swing Gear A-2 engages the CAM and the CAM turns counterclockwise to select a mode. (See Fig. A.) There are three mode options controlled by the Switch: A: Transmitmode, B: Receive mode and C: Copy mode. In Fig. B, you can see which mode is selected by the position of the rib in the CAM.

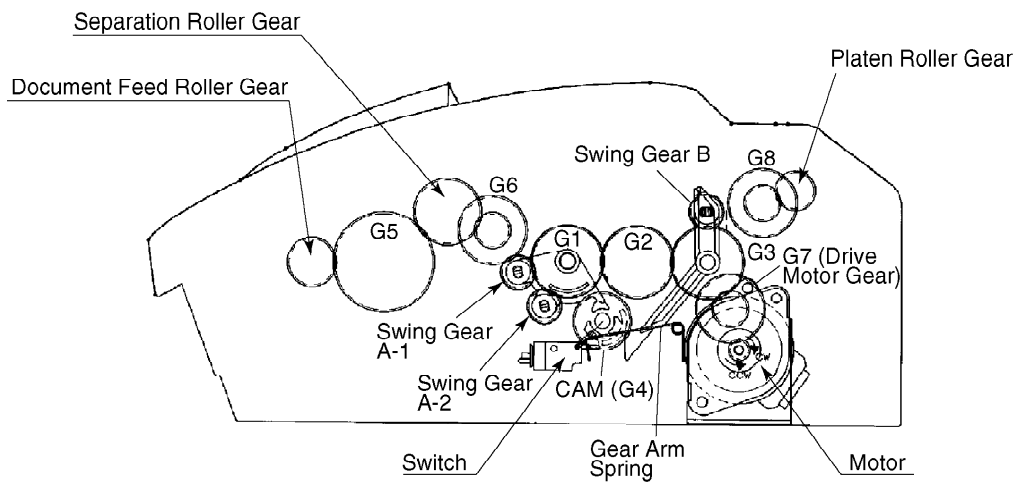


Fig. A [The operation is in the Transmit mode (A).]

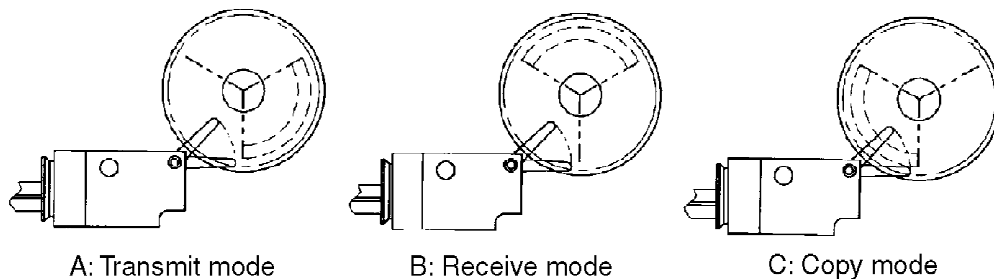


Fig. B

5.4.6.2. MODE OPERATION

Once a mode is selected, the Drive Motor Gear rotates clockwise (CW) and then the Swing Gear A-1 controls the mode operation.

A: Transmit mode

Swing Gear A-1 engages G6 and conveys its drive power to the Separation Roller Gear for pre-feeding documents.

B: Receive mode

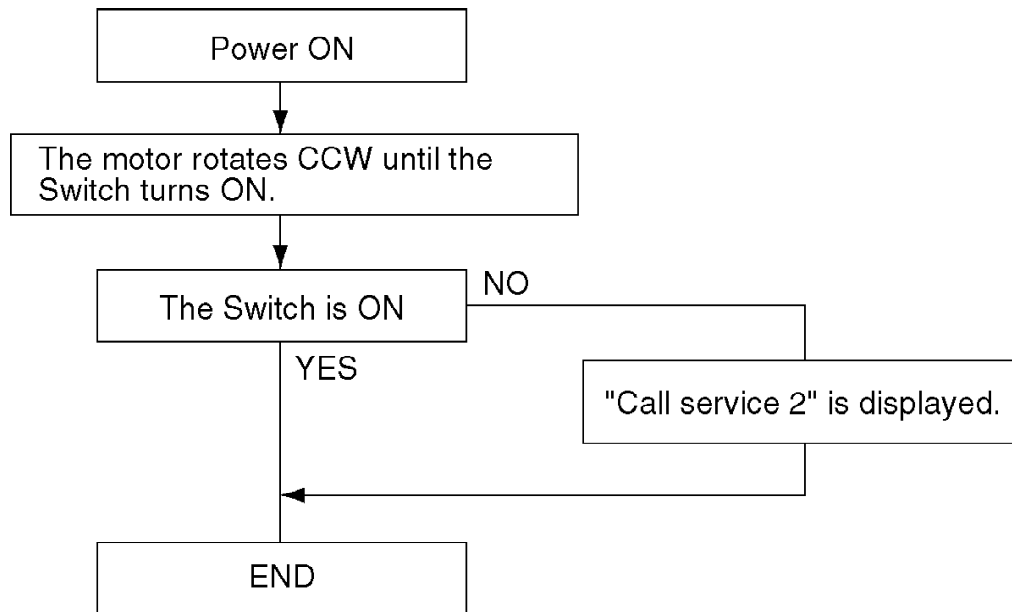
Swing Gear B engages G8 and conveys its drive power to the Platen Roller Gear for printing the received data.

C: Copy mode

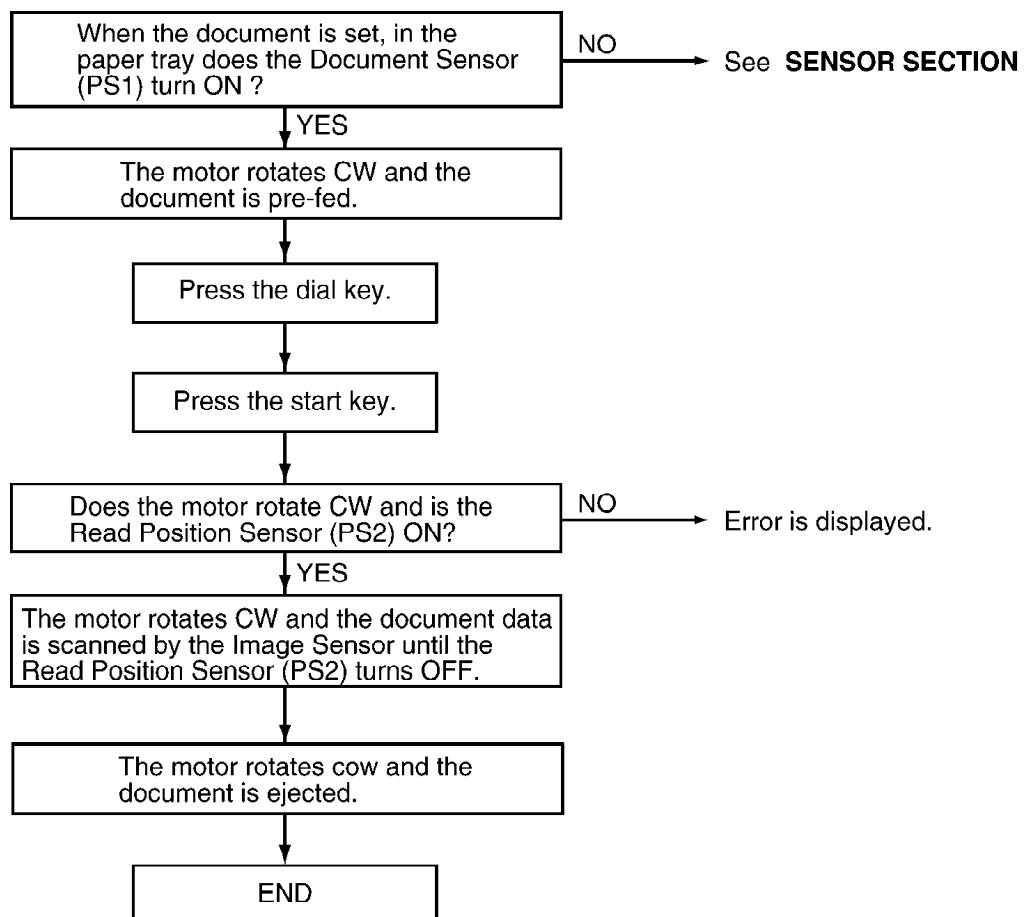
Swing Gear A-1 and B engage Gears 6 and 8 respectively and drive both the Separation Roller Gear and the Platen Roller Gear for feeding documents and recording paper in the copying operation.

5.4.6.3. MECHANICAL MOVEMENTS IN THE MAIN OPERATIONS

5.4.6.3.1. IDLE STATUS

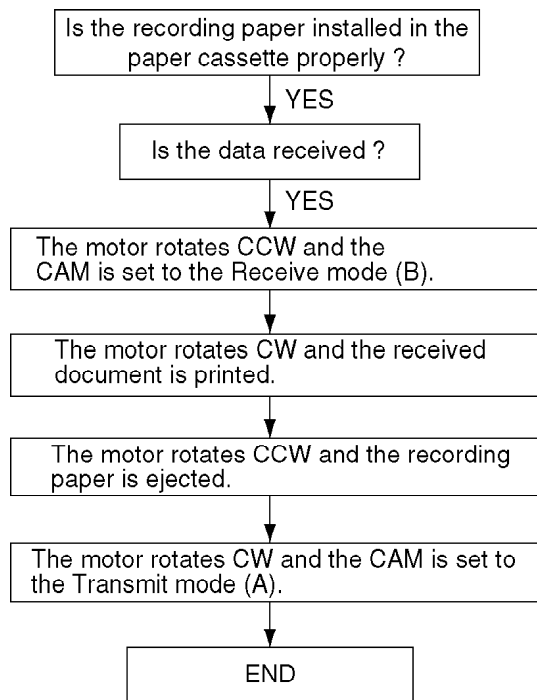


5.4.6.3.2. SCANNING



CROSS REFERENCE:
SENSOR SECTION ()

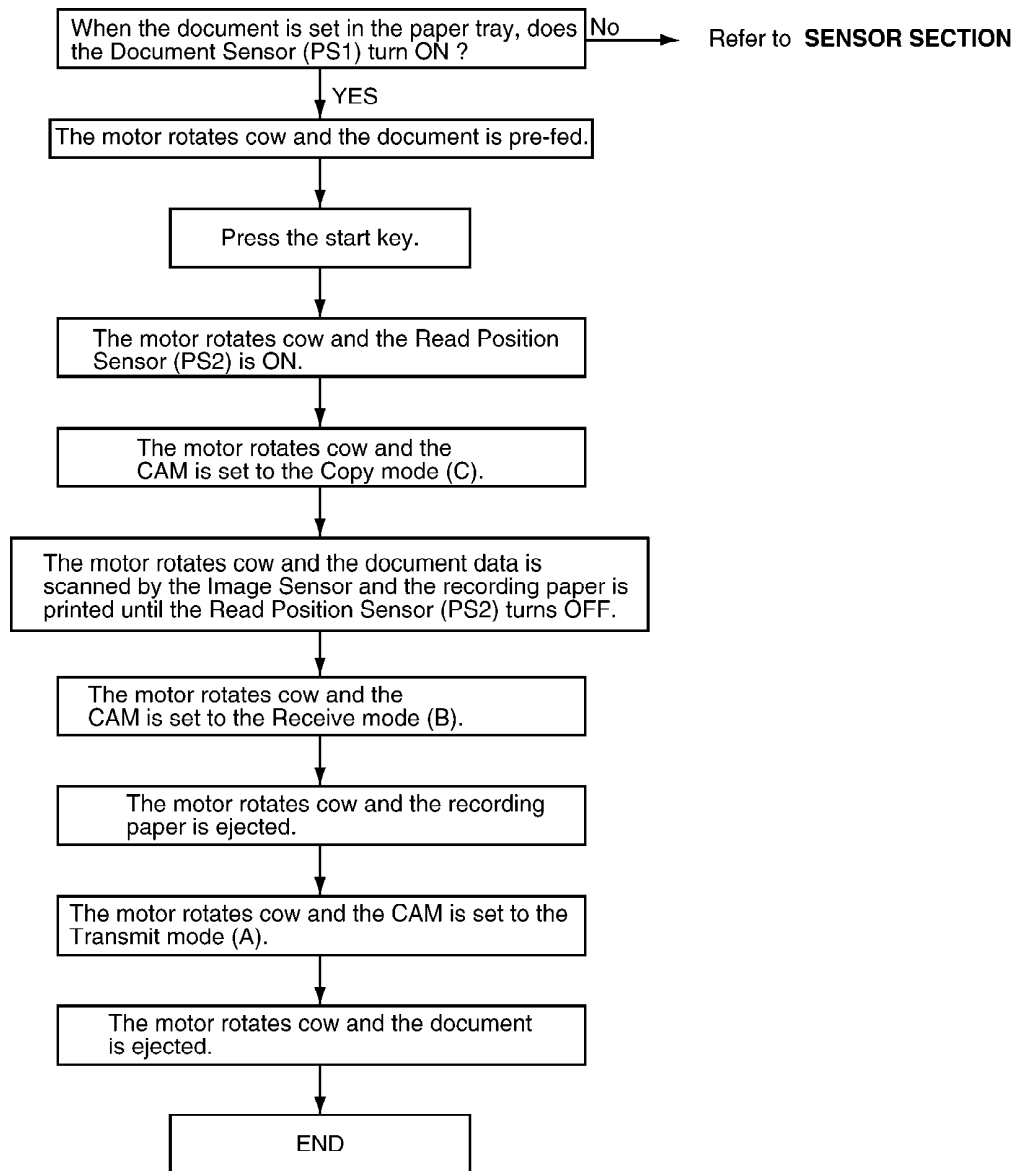
5.4.6.3.3. PRINTING



Note:

See 6.5. SENSERS AND SWITCHES.

5.4.6.3.4. COPYING

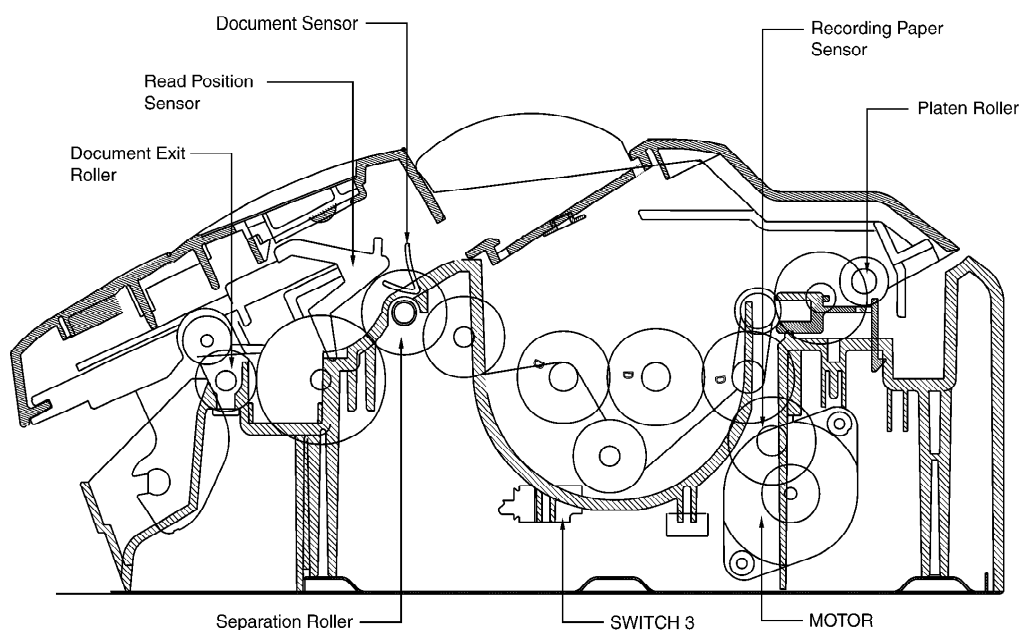


CROSS REFERENCE:
SENSOR SECTION ()

5.5. SENSORS AND SWITCHES

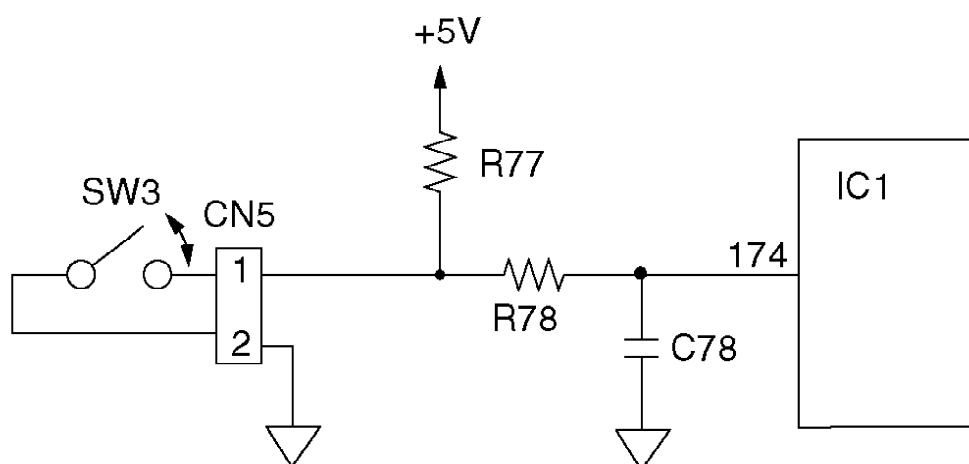
All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Digital	SW3	Motor Position	_____
Analog	SW1	Cover Open and Paper set	[CHECK COVER] and [OUT OF PAPER]
	SW2	Hook SW	_____
Operation Panel	PS2	Document Read Position	[REMOVE DOCUMENT]
	PS1	Document	[CHECK DOCUMENT]



5.5.1. MOTOR POSITION SENSOR

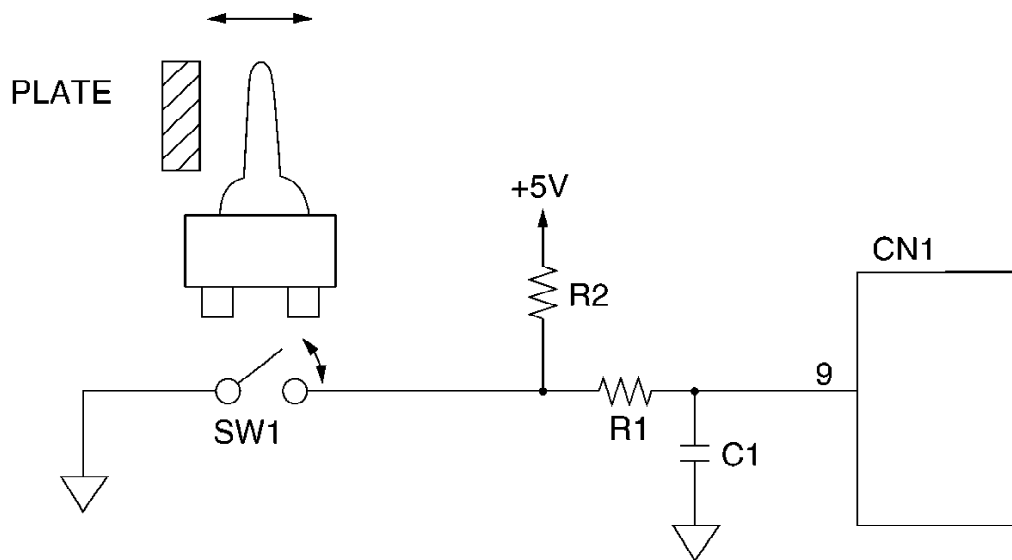
This sensor is a detection switch for recording the position of the CAM.



Digital Board	
	Signal (IC1-174 Pin)
Home position	Low level
Other	High level

5.5.2. COVER OPEN AND PAPER SET SWITCH (SW1)

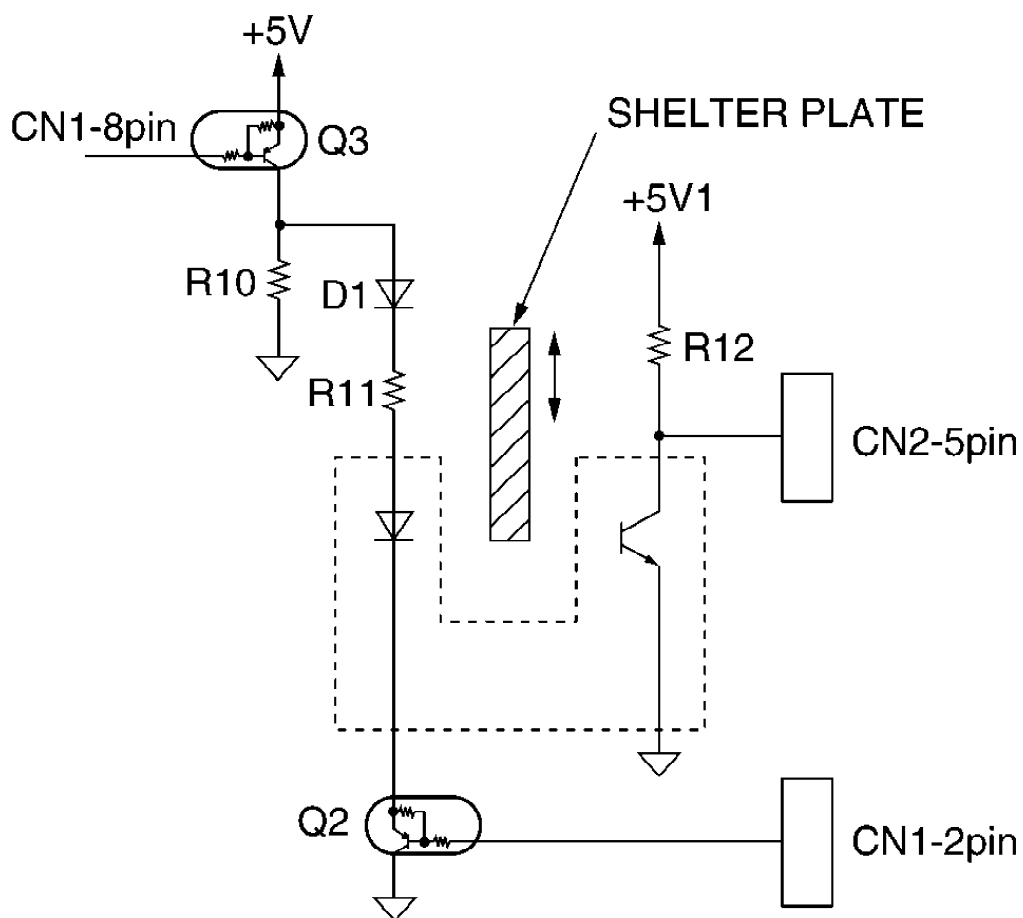
When there is no recording paper, the plate is separated from the switch lever and the switch turns off. / Pin 9 of CN101 (Analog board) becomes a high level. / When there is recording paper, the plate pushes the switch lever and the switch turns ON. / Pin 9 of CN101 (Analog board) becomes a low level.



Analog Board	
	Signal (CN1-9 Pin)
Paper	Low level
No paper	High level

5.5.3. READ POSITION (PS2)

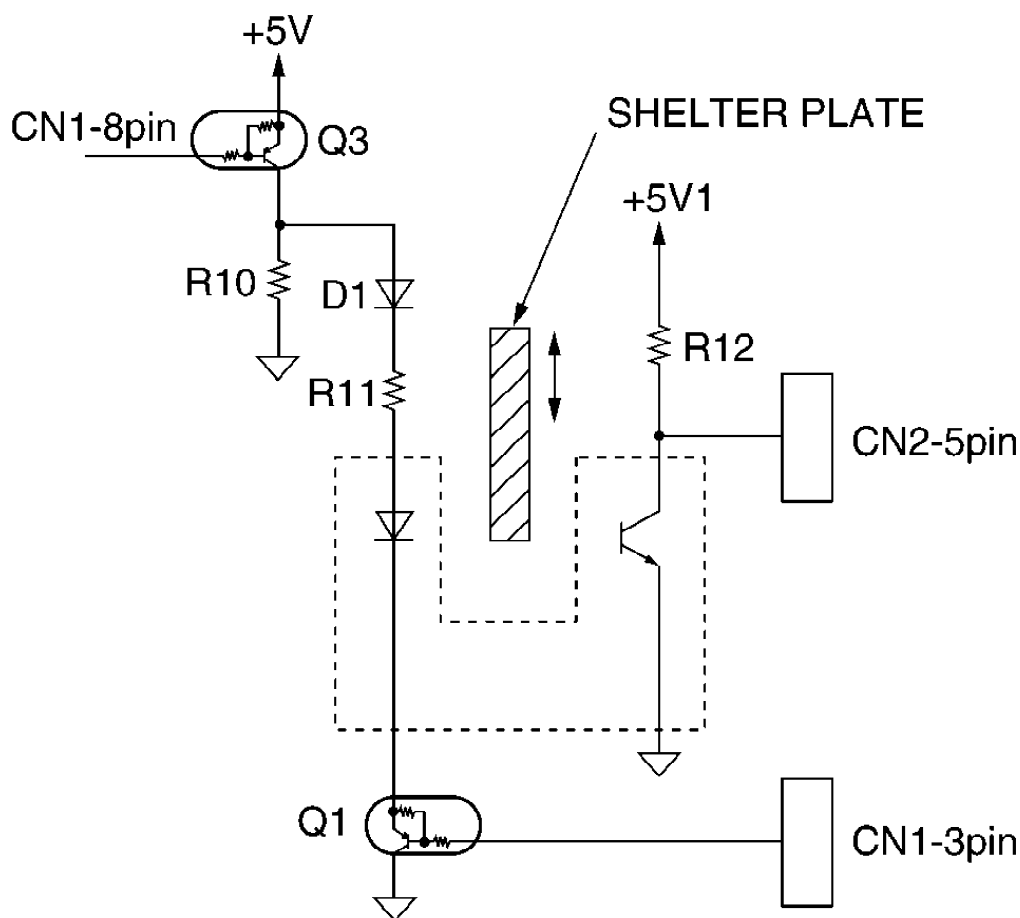
When a document is brought to the read position, the shelter plate passes the sensor light, the photo transistor becomes ON, and the input signal of the CN2-5 pin (Operation) becomes a low level. When there is no document at the read position, the shelter plate closes the sensor light, the photo transistor becomes OFF, and the input signal of the CN2-5 pin (Operation) becomes a high level. (When checking this sensor, CN1-8 pin, 2pin becomes low level).



Operation Board		
	Photo transistor	Signal (CN2-5 Pin)
Out of the Read Position	OFF	High level
At the Read Position	ON	Low level

5.5.4. DOCUMENT SENSOR (PS1)

When a document is set, the shelter plate closes the sensor light, the photo transistor becomes OFF, and the input signal of the CN2-5 pin (Operation) becomes a high level. When there is no document, the shelter plate passes the sensor light, the photo transistor becomes ON, and the input signal of the CN2-5 pin (Operation) becomes a low level. / (When checking this sensor, the CN1-8 pin, 3pin becomes a low level.)



Operation Board		
	Photo transistor	Signal (CN2-5 Pin)
No document	ON	Low level
Set document	OFF	High level

5.6. MODEM SECTION

5.6.1. FUNCTION

The unit uses a 1 chip modem (IC1), enabling it to act as an interface between the control section for FAX sending and receiving, and the telephone line. During a sending operation, the digital image signals are modulated and sent to the telephone line. During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T. This 1 chip modem (IC1) has hardware which sends and detects all of the necessary signals for FAX communication and DTMF. / It can be controlled by writing commands from the ASIC (IC1) to the register in the modem (IC1). / This modem (IC1) also sends DTMF signals, generates a call tone (from the speaker), and detects busy tones, dial tones and DTMF.

Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. ON ITU-T (International Telecommunications' Union.)

The No. XIV Group of ITU-T, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2. Definition of Each Group

- Group I (G1)

A-4 size documents without using formats which reduce the band width of a signal sent over telephone lines. / Determined in 1968. / Transmission for about 6 minutes at scanning line density of 3.85 lines/mm.

- Group II (G2)

Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes. / Methods to suppress redundancy are not used. / Determined in 1976.

- Group III (G3)

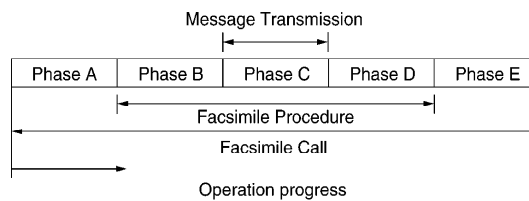
A method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent with about one minute. / Determined in 1980.

- Group IV (G4)

Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible. / The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A : Call setting

Call setting can be manual/automatic.

Phase B : Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc. and for terminal control. It implements the terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C : Message transmission

Phase C is the procedure for transmitting facsimile messages.

Phase D : Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C are repeated for transmission.

Phase E : Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time

$$[\text{Transmission Time}] = [\text{Control Time}] + [\text{Image Transmission Time}] + [\text{Hold Time}]$$

Transmission time consists of the following.

Control time:

This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:

This is the time required after the document contents have been sent to confirm that the document was in fact sent, and to check for telephone reservations and/or the existence of continuous transmission.

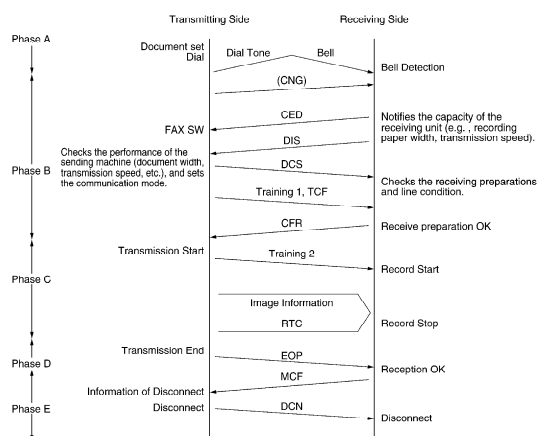
5. Facsimile Standards

Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension: MH Mode 2 dimension: MR Mode (K=2.4)
Resolution	Main Scan: 8 pel/mm Sub Scan: 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value: 10, 20 Can be recognized in 40ms.

6. Explanation of Technology

a. G3 Communication Signals (T. 30 Binary Process)

For G3 facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals. / Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1. / An example of the binary process in G3 communication is shown below.



Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and of the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal) / Identification Signal Format.....00000001

Function: / Notifies the capacity of the receiving unit. The added data signals are as follows.

(Example)

Bit No.	DIS/DTC	DCS
1	Transmitter - T.2 operation	
2	Receiver - T.2 operation	Receiver - T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter - T.3 operation	
5	Receiver - T.3 operation	Receiver - T.3 operation
6	Reserved for future T.3 operation features.	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter - T.4 operation	
10	Receiver - T.4 operation	Receiver - T.4 operation
11, 12	Data signaling rate	Data signaling rate
(0, 0)	V.27 ter fall back mode	2400 bit/s, V.27 ter
(0, 1)	V.27 ter	4800 bit/s, V.27 ter
(1, 0)	V.29	9600 bit/s, V.29
(1, 1)	V.27 ter and V.29	7200 bit/s, V.29
13	Reserved for the new modulation system.	
14	Reserved for the new modulation system.	
15	Vertical resolution = 7.7 line/mm	Vertical resolution = 7.7 line/mm
16	Two-dimensional coding capability	Two-dimensional coding

Bit No.	DIS/DTC	DCS
17, 18 (0, 0)	Recording width capabilities 1728 picture elements along scan line length of 215 mm \pm 1%	Recording width 1728 picture elements along scan length of 215 mm \pm 1%
(0, 1)	1728 picture elements along scan line length of 215 mm \pm 1% and 2048 picture elements along scan line length of 255 mm \pm 1% and 2432 picture elements along scan line length of 303 mm \pm 1%	2432 picture elements along scan length of 303 mm \pm 1%
(1, 0)	1728 picture elements along scan line length of 215 mm \pm 1% and 2048 picture elements along scan line length of 255 mm \pm 1% and 2432 picture elements along scan line length of 303 mm \pm 1%	2048 picture elements along scan length of 255 mm \pm 1%
(1, 1)	1728 picture elements along scan line length of 215 mm \pm 1% and 2048 picture elements along scan line length of 255 mm \pm 1%	Invalid
19, 20 (0, 0)	Maximum recording length capability A4 (297 mm)	Maximum recording length A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid

Signal.....DCS (Digital Command Signal) / Identification Signal Format.....X1000001

Function: / Notifies the capacity of the receiving machine obtained at DIS and announces the transmission mode of the sender. The added data signals are as follows.

(Example)

Bit No.	DIS/DTC	Standard setting	DCS
21, 22, 23 (0, 0, 0) (0, 0, 1) (0, 1, 0) (1, 0, 0) (0, 1, 1) (1, 1, 0) (1, 0, 1) (1, 1, 1)	Minimum scan line time capability of the receiver 20 ms at 3.85 l/mm: T7.7 = T3.85 40 ms at 3.85 l/mm: T7.7 = T3.85 10 ms at 3.85 l/mm: T7.7 = T3.85 5 ms at 3.85 l/mm: T7.7 = T3.85 10 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 20 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 40 ms at 3.85 l/mm: T7.7 = 1/2 T3.85 0 ms at 3.85 l/mm: T7.7 = T3.85		Minimum scan line time 20 ms 40 ms 10 ms 5 ms 0 ms
24	Extend field	1	Extend field
25	2400 bit/s handshaking	0	2400 bit/s handshaking
26	Uncompressed mode	0	Uncompressed mode
27	Error correction mode	0	Error correction mode
28	Set to "0".	0	Frame size 0 = 256 octets 1 : octets
29	Error limiting mode	0	Error limiting mode
30	Reserved for G4 capability on PSTN	0	Reserved for G4 capability c
31	Unassigned	0	
32	Extend field	1	Extend field
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	0	Recording width Recording width indicated b 18 Recording width indicated b field bit / information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	0	Middle 1216 elements of 172 elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	0	Middle 864 elements of 1728 elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	0	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	0	Invalid
38	Reserved for future recording width capabilities.	0	
39	Reserved for future recording width capabilities.	0	
40	Extend field	1	Extend field
41	Semi super time / mm	1	
42	Semi super time / mm	0	
43	Super time	0	

Bit No.	DIS/DTC	Standard setting	DCS
44	Inch	0	
45	mm	1	
46	MSC/SF	0	
47	Select Polling	0	
48	EXT	0	

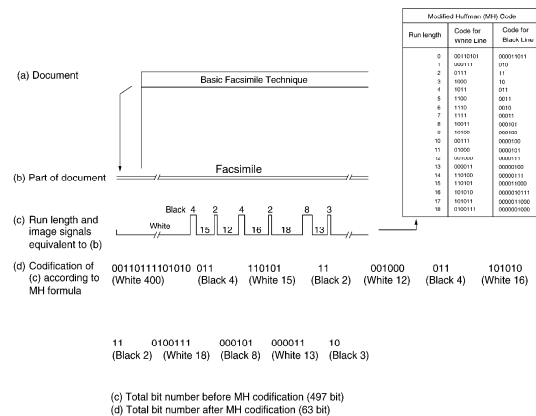
Note 1 - Standard facsimile units conforming to T.2 must have the following capability: Index of cooperation (IOC)=264.

Note 2 - Standard facsimile units conforming to T.3 must have the following capability: Index of cooperation (IOC)=264.

Note 3 - Standard facsimile units conforming to T.4 must have the following capability: Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	_____	A fixed pattern is transmitted to the receiving side at a speed (2400 to 9600 bps) designated by the sender and the receiving side optimizes the automatic equalizer, etc., according to this signal.
TCF (Training Check)	_____	Sends 0 continuously for 1.5 seconds at the speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly received, FTT (Failure To Train) X0100010 is relayed to sender. The sender then reduces the transmission speed by one stage and initiates training once again.
Training 2	_____	Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	_____
RTC (Return to Control)	_____	Sends 12 bits (0...01 × 6 times) to the receiving side at the same speed as the image signal and notifies completion of transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there are still more documents to be sent, they are output instead of EOP. After MCF reception, the sender transmits an image signal of the second sheet.
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it is output after RTC.
Signal	Identification Signal Format	Function
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is received.

b. Redundancy Compression Process Coding Mode / This unit uses one-dimensional MH format.



5.6.2. MODEM CIRCUIT OPERATION

The ASIC (IC1) has all the hardware satisfying the ITU-T standards mentioned previously. / The modem is included in IC1. The signal communicates with the TEL line through the analog front end IC (IC5) of digital/analog, analog/digital convertor. The modem in IC1 is operated using the 20.736 MHz (x2) clock.

1. Facsimile Transmission/DTMF Line Send

The digital image data on the data bus is modulated in the modem (IC1), and sent to analog front end (IC5) as the digital data, then it is converted to the analog signal there. Passing through IC9 and IC6, the signal is sent to NCU section.

Refer to **CHECK SHEET ()**

2. Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 15 of the analog front end (IC5). The signals that enter pin 15 of the analog front end (IC5) convert the analog signals to the digital signals, then the data is sent to the modem (IC1).

Refer to **CHECK SHEET ()**

3. DTMF Transmission

The DTMF signal generated in the ASIC (IC1) is sent to the analog front end (IC5) to perform the digital/analog conversion, then output from pin 3 of IC5, and is then sent to the circuit on the same route as used for facsimile transmission.

Refer to **CHECK SHEET ()**

4. Call Tone Transmission

This is the call signal which is generated in the ASIC (IC1) and sent to the speaker.

Refer to **CHECK SHEET** ()

5. Busy/Dial Tone Detection

The path is the same as FAX receiving.

5.7. ANALOG UNIT BLOCK DIAGRAM

5.8. NCU SECTION

5.8.1. GENERAL

This section is the interface between the telephone line and external telephone. It is composed of an EXT. TEL Line relay (RLY1), bell detection circuit, EXT TEL selection circuit, pulse dialing circuit, line amplifier, sidetone circuits and multiplexer.

5.8.2. LINE RELAY (RL1)

Circuit Operation

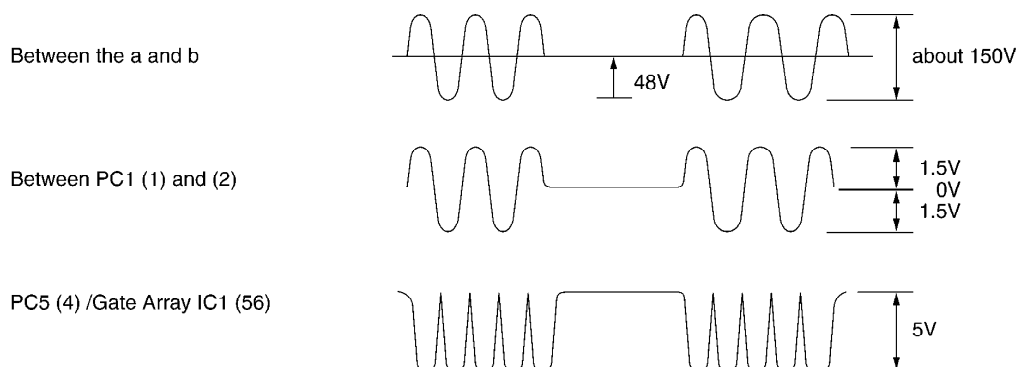
Normally, this relay switches to the external telephone side (Break) and switches to the open side (make) when the unit starts facsimile communication. Pulse dialing is also performed by ON /OFF of the relay.

[IC1 (99) High Level → CN9 (8)] → CN1(8) → Q3 ON → RL1 (make)

5.8.3. BELL DETECTION CIRCUIT

Circuit Operation

The signal waveform for each section is indicated below. The signal (low level section) input to pin 19 of ASIC IC4 on the digital board is read.



TEL LINE → PC1 (1, 2 - 4) → CN1(6) → [CN9(6) → R119 → IC1(56)]

5.8.4. PULSE DIALING

[IC1 (99) High Level → CN9 (8)] → CN1 (8) → Q3 ON → PC1 ON (make)

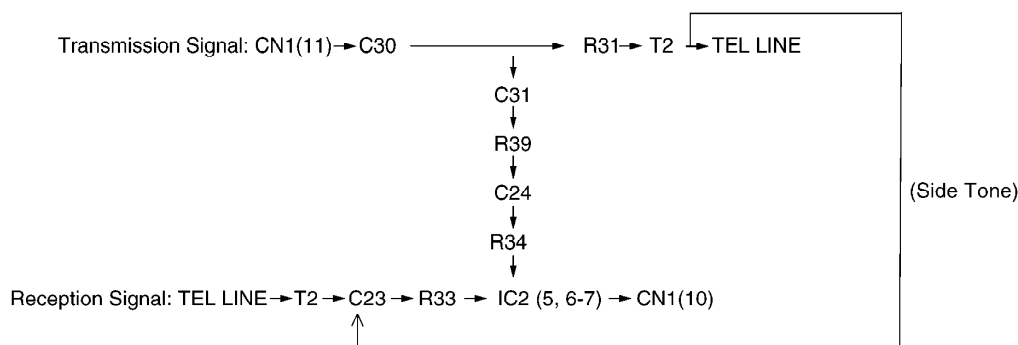
Refer to # 013 on the **PROGRAM MODE TABLE** ()

5.8.5. LINE AMPLIFIER AND SIDE TONE CIRCUITS

1. Circuit Operation

The reception signal received as output from line transformer T2 is given as input to C23, R33 and IC2 pin (6). / Then it is input to the reception system at an amplifier gain of 5.9 dB from pin (6). / The transmission signal is input from CN1 pin (11), and output to the TEL line through C30, R31 and T2. Without a side tone circuit,

the transmission signal would return to the reception amplifier via C30 and R31. Here, the signal output from CN1 pin (11) passes through C30, C36 and R39 and enters the amplifier IC2 pin (5). This is used to cancel the return portion of the transmission signal. This is the side tone circuit.



5.9. ITS (Integrated telephone System) and MONITOR SECTION

5.9.1. GENERAL

During the monitor operation, the speaker output passes through the power amplifier (IC1) [Analog board]. / The DTMF signal is output from the modem (IC1: digital board). The alarm tone, the key tone, bell tone, and beep are output from gate array IC1 (digital board). During a pulse dial operation, the monitor tone is output from gate array IC1.

5.9.2. MONITOR CIRCUIT

1. Function

This is the function when you are not holding the handset and can hear the caller's voice from the line.

2. Circuit Operation

(Monitor Signal Path)

Signals received from the telephone line are output through at the speaker via the following path.

Refer to **CHECK SHEET** ()

5.9.3. HANDSET CIRCUIT

1. Transmission signal

Refer to 2.3.4.4. Analog Board Section

2. Reception Signal

Refer to **CHECK SHEET** ()

5.9.4. HANDSET ALC CIRCUIT

1. Function

Generally as the distance from handset to exchanger becomes farther, the line current becomes less and the volume of the voice from handset becomes smaller because of transmission loss. While being a shorter distance, the result is reversed. This circuit makes the fluctuation small.

2. Circuit Operation

When the telephone line current is higher than 55 mA (at a short distance), Q6 is turned ON, and PC5 is turned ON simultaneously. That causes Q11 and Q12 to turn on. Decreases the value of handset Tx and Rx level. when Q11(Base) and Q12(Base) is low, it increases the value of handset Tx and Rx level.

5.9.5. MONITOR CIRCUIT

1. DTMF Monitor

(Monitor)

Refer to **CHECK SHEET** ()

(Handset)

2. Alarm/Beep/Key tone/Bell

Refer to **CHECK SHEET** ()

3. Dummy Ring Back Tone

Same with the modem signal transmission.

5.10. EXT. TEL

EXT. TEL JACK is provided for the external TEL connection. / Connect the telephone to the EXT. TEL JACK. Because the unit has the priority, EXT. TEL is disconnected when the unit is OFF-HOOK.

1. EXT. TEL DC LOOP

(Signal Path) / T → CN4(3) → POS1 → L2 → RL1(3-5) → L3 → CN5(4) → EXT.TEL → CN5(3) → L4 → R14 → L1 → CN4(4) → R

2. REMOTE RECEIVING

This is the parallel connection DTMF signal for the TEL or EXT. TEL mode between T and R. When the other party is a FAX, the unit changes to FAX receiving.

(Signal path)

Refer to **CHECK SHEET** ()

Note:

Refer to **ANALOG UNIT BLOCK DIAGRAM** () for CIRCUIT DIAGRAM

5.11. OPERATION BOARD SECTION

The unit consists of an LCD (Liquid crystal display), KEYs, photo interrupters (sensor), and analog switches (for key scan). / The key scan (analog switch control, reading), sensor detection (sensor control, reading) and LCD control are all controlled by I/O of ASIC (IC1) on the digital board.

5.11.1. KEY SCAN

When CN1(8) (OPSEL) is "H", the analog switch (IC1) is available. The "KLATCH", "KSCLK" and "KTXD" control the analog switch (IC1) to read at KIN0~3.

Analog Switch (IC1) Control

	0	1	2	3	4	5	6	7
KLATCH (A)	L	H	L	H	L	H	L	H
KSCLK (B)	L	L	H	H	L	L	H	H
KTXD (C)	L	L	L	L	H	H	H	H

Key Matrix

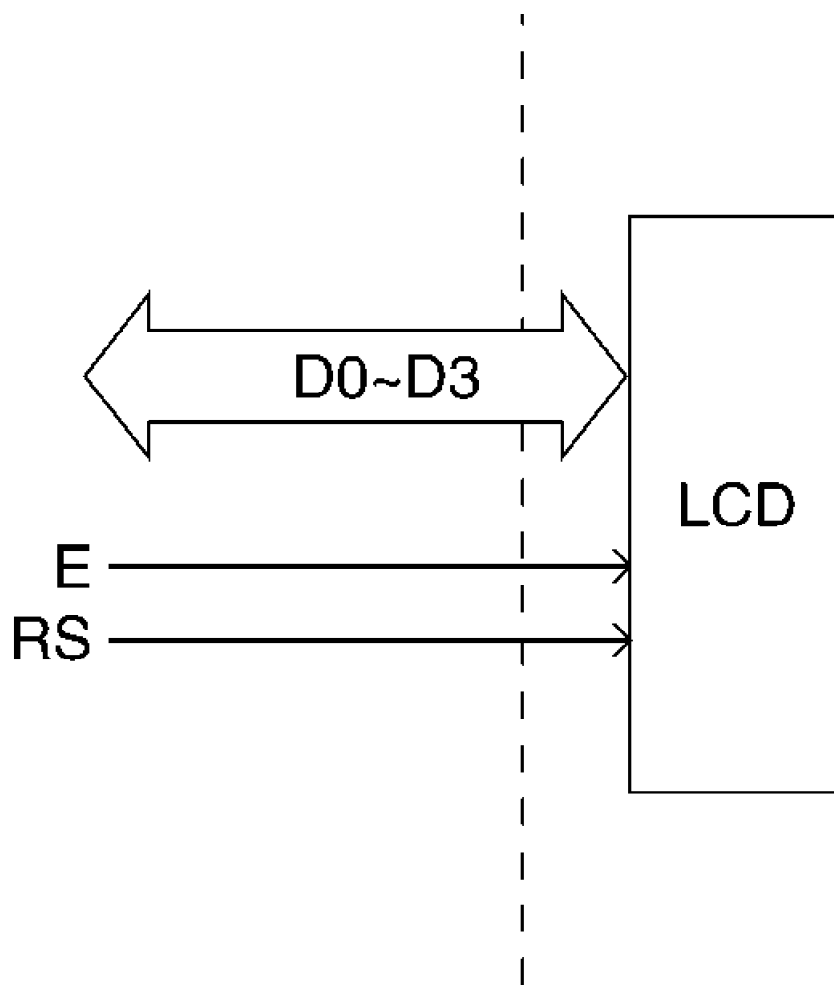
	0	1	2	3	4	5	6	7
KIN0		VOLUME HIGH (SW6)		RECEIVE MODE (SW7)				
KIN1	NEXT → (SW14)	MONITOR (SW13)	REDIAL/ PAUSE (SW12)	COPY (SW15)	0 (SW11)	2 (SW8)	8 (SW10)	5 (SW9)
KIN2	← PREV (SW22)	VOLUME LOW (SW21)	MUTE (SW20)	STOP (SW23)	# (SW19)	3 (SW16)	9 (SW18)	6 (SW17)
KIN3	HELP (SW30)	MENU (SW29)	FLASH (SW28)	FAX/ START/SET (SW31)	* (SW27)	1 (SW24)	7 (SW26)	4 (SW25)

5.11.2. SENSOR DETECTION

When CN1(8) (OPSEL) is "L", the detection of the document sensor and read start position sensor are available.

5.11.3. LCD CONTROL

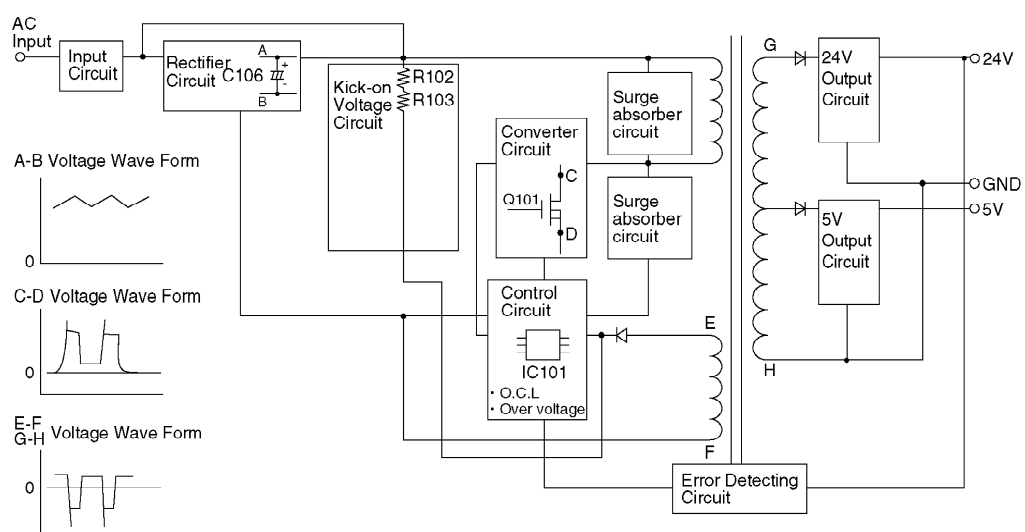
"KTXD", "KSCLK", "KLATCH" and "KSTART" are sent as D0~D3 to control the LCD.



5.12. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method.

Block Diagram



[Input Circuit]

The input current goes into the input rectifier circuit through the filter circuit. The filter circuit

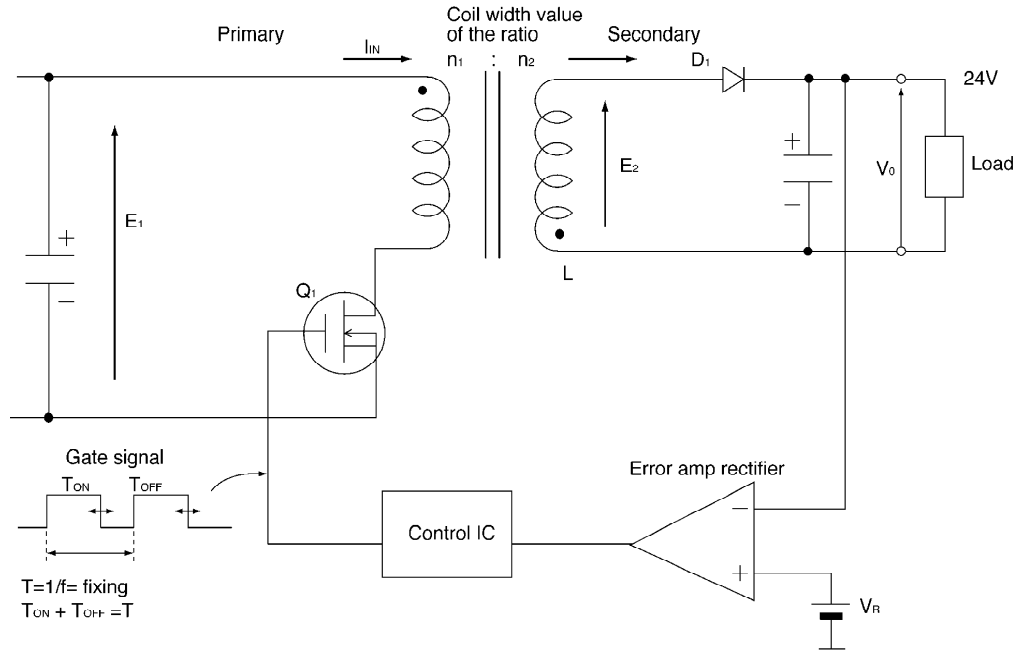
decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

The input current is rectified by D101,D102,D103 and D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.



The following is an overview of how the power supply unit is controlled.

The control method of this power supply unit is pulse width modulation.

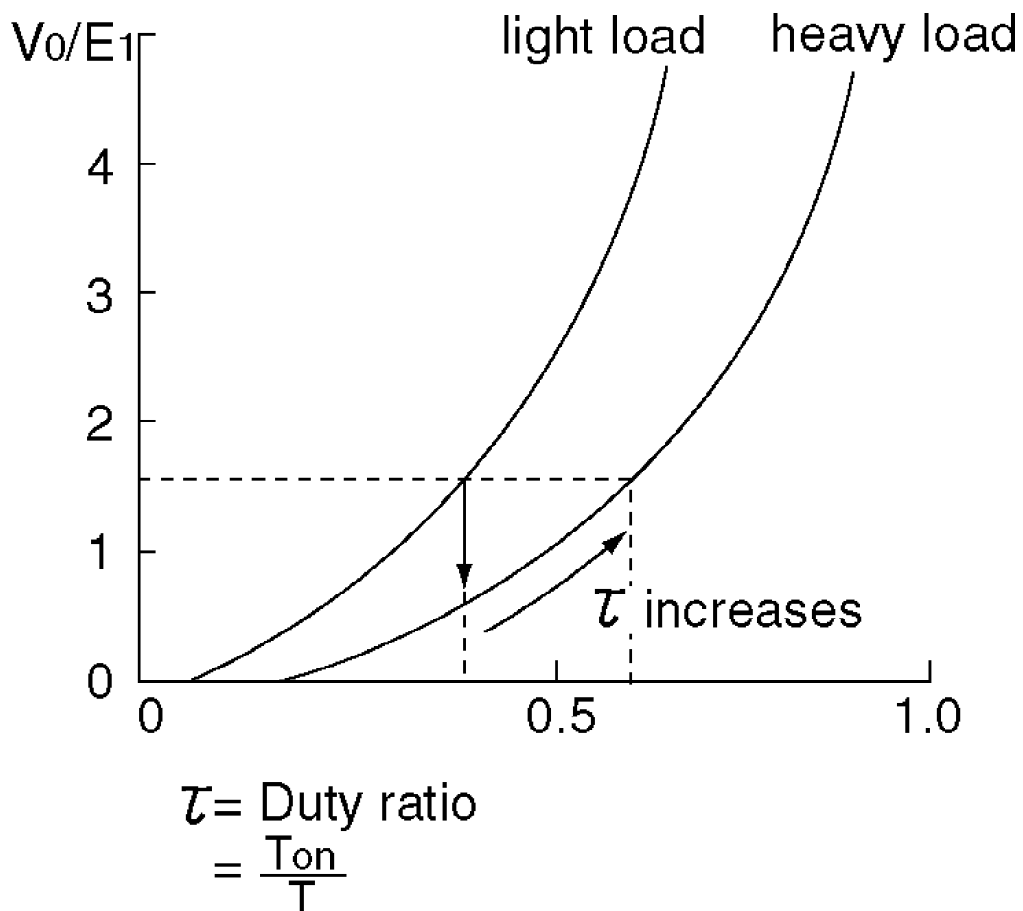
When Q_1 is ON, the energy is charged in the transformer primary coil according to E_1 . When Q_1 is OFF, the energy is output from the secondary transformer as follows.

$L \rightarrow D_1 \rightarrow \text{Load} \rightarrow L$

Then the power is supplied to the Load. When Q_1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how T_{ON} is controlled, stabilization occurs. Also, when the current load becomes too large, in order to decrease the voltage output, the increase in is controlled and the output voltage is stabilized.

Therefore, basically the timing: T_{on}/T_{off} of Q_1 controls the output voltage.

Output/Input voltage value of ratio



[Surge Absorber Circuit]

This circuit is for absorbing surge voltage generated by the transformer.

[Control Circuit and Detecting Circuit]

The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.

In this power supply, the duty ratio is defined by changing the ON period of the main transistor. This is shown as follows.

When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

[Over Current Limiter (O.C.L.)]

The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is limited by this circuit.

[Over Voltage Circuit]

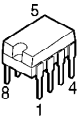
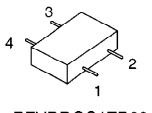
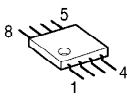
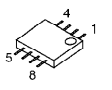
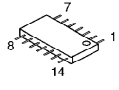
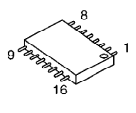
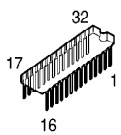
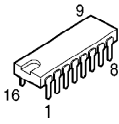
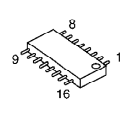
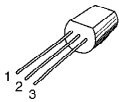
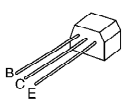
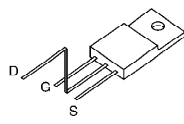
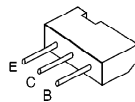
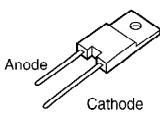
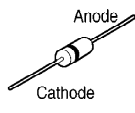
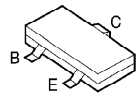

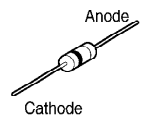
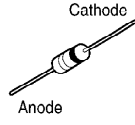
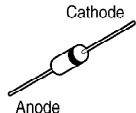
If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

Dummy load method (to quickly check the power supply output)

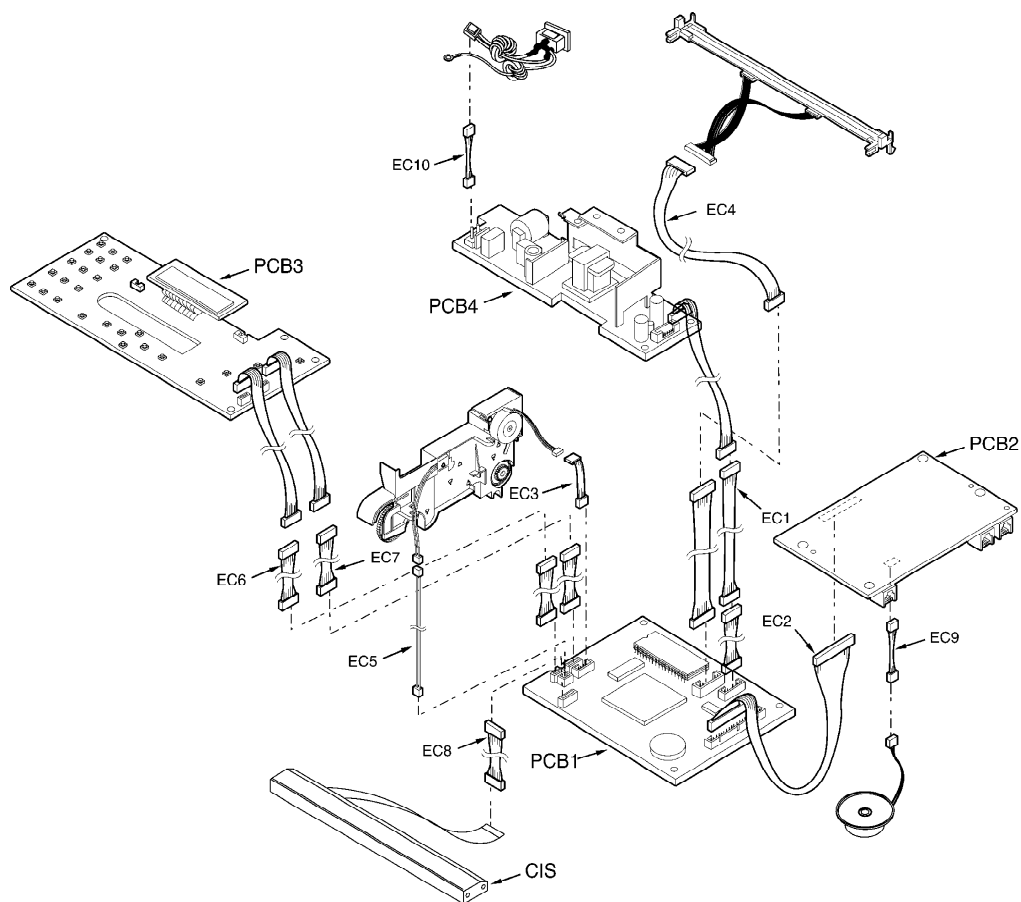
Refer to 2.3.4.5. Power Supply Board Section.

6. TERMINAL GUIDE OF THE ICs TRANSISTORS

AND DIODES

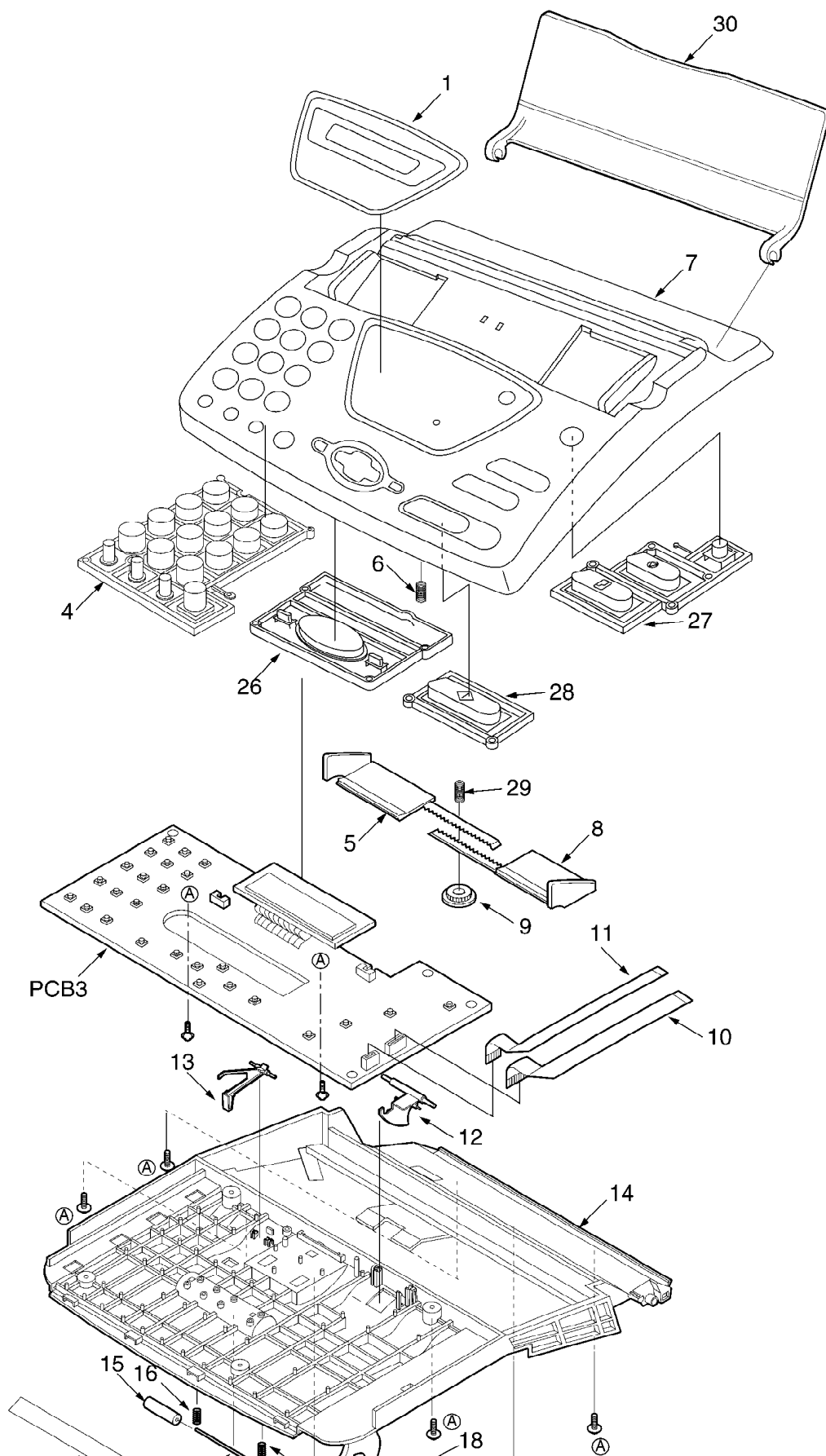
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 <p>PFDITC35133F</p>	 <p>PFWIFT72SA</p>	 <p>PFVIT2003APS</p>	 <p>PQVICM4051BF</p>	 <p>PFVITA7805F AN1431T</p>
 <p>2SA933</p>	 <p>2SK2651</p>	 <p>2SB1322</p>	 <p>PFVDSF5LC20U</p>	 <p>Anode Cathode MA165, MA4020 PQVDERA1506 PQVDERA1802</p>
 <p>PQVTDTC114EU, PQVTDTC143E PQVTDTA143EU, B1197K, 2SB1218A, 2SD1819A</p>		 <p>PQVDRLS73T</p>	 <p>Anode Cathode PFVD1N4005, MA4220 PFVDD1NL20U, MA7200</p>	 <p>Cathode Anode PFVDRMRLS245 MA4056</p>
 <p>Cathode Anode 1SS133</p>				

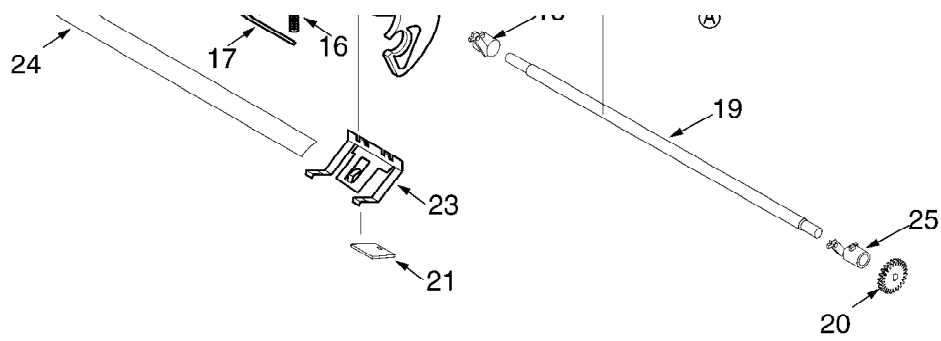
7. FIXTURES AND TOOLS



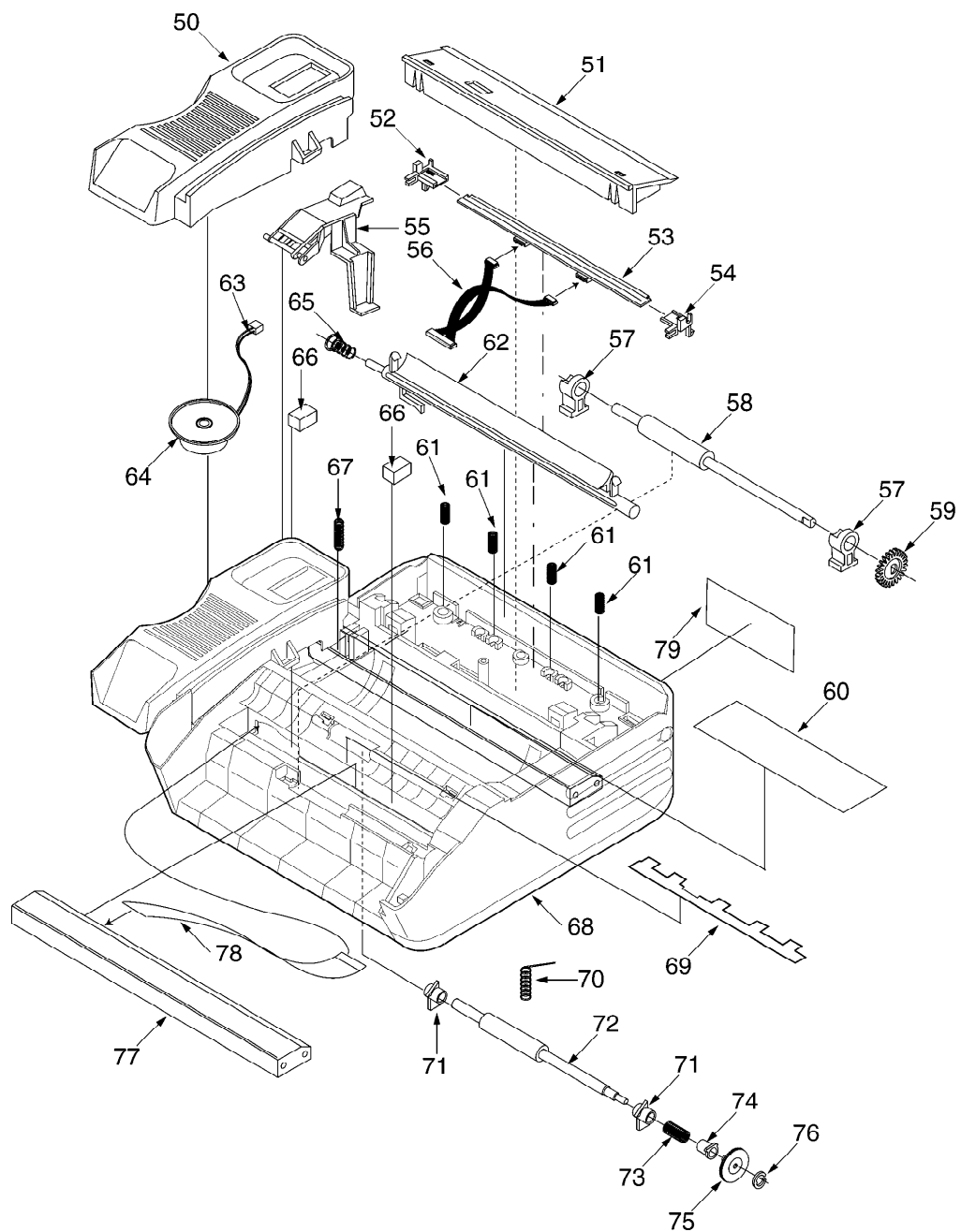
8. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

8.1. OPERATION PANEL SECTION

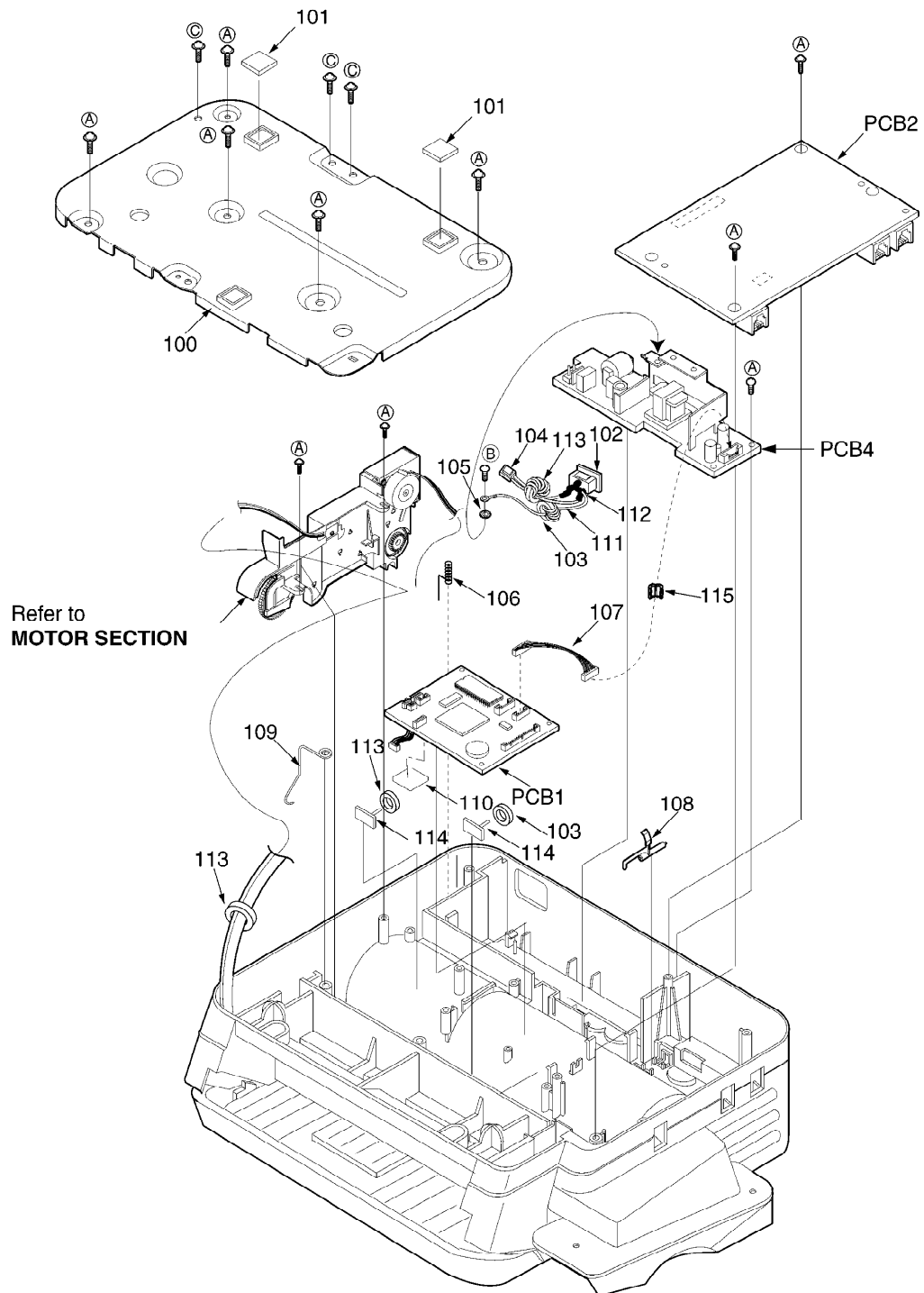




8.2. UPPER CABINET SECTION

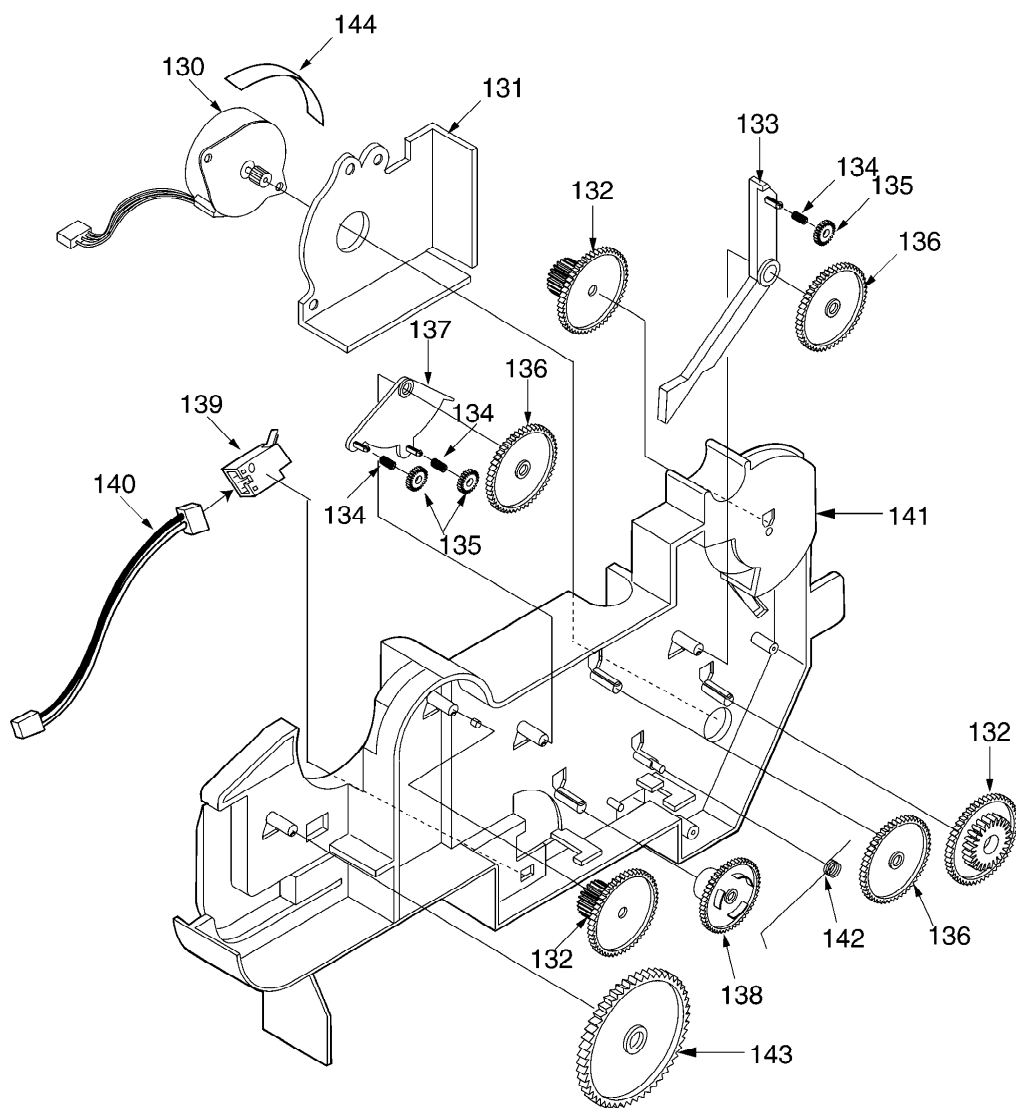


8.3. LOWER CABINET/P.C.B. SECTION



CROSS REFERENCE:
MOTOR SECTION ()

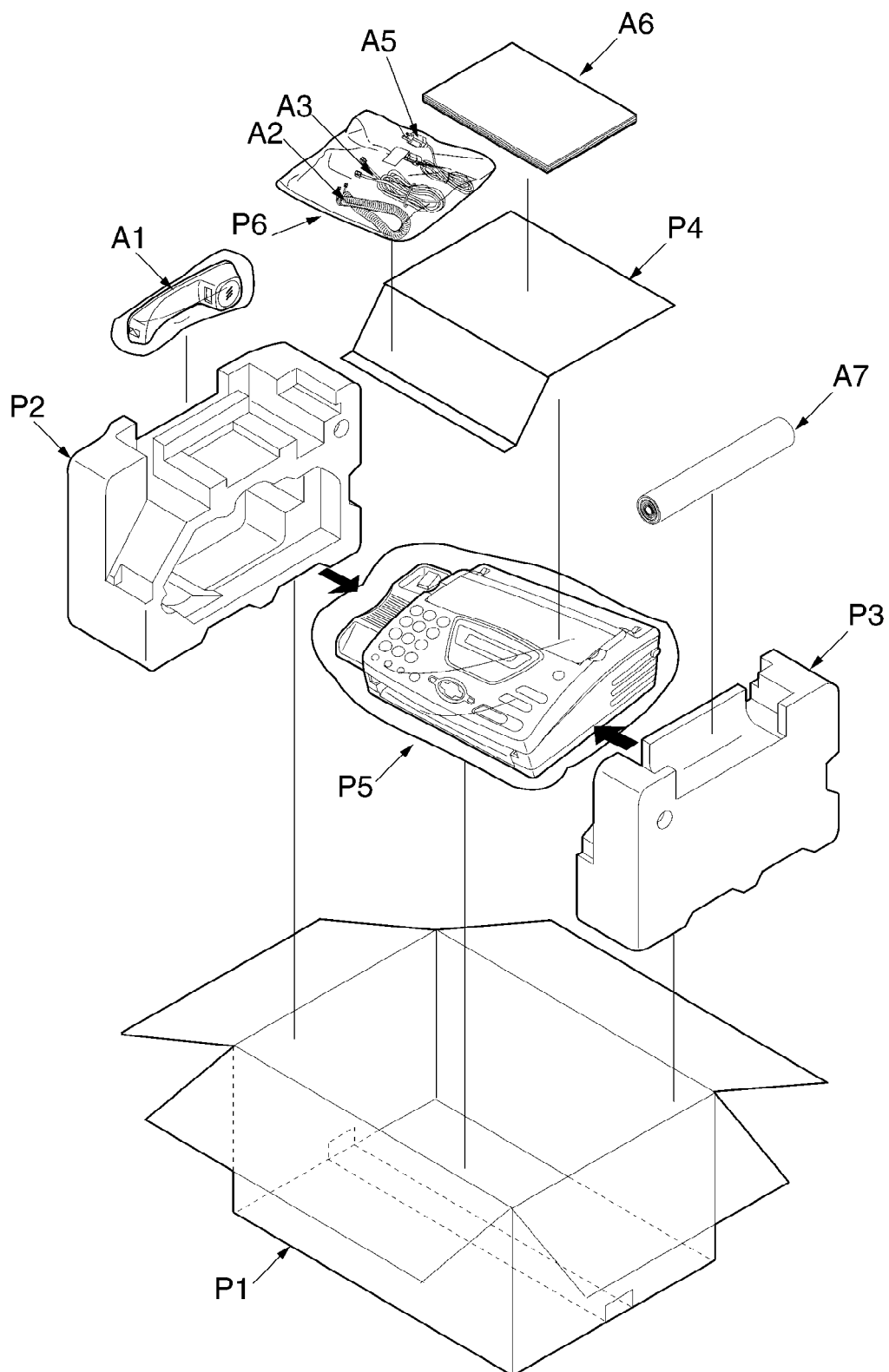
8.4. MOTOR SECTION



8.5. ACTUAL SIZE OF SCREWS


	Part No.	Illustration
Ⓐ	XTW3 + S10P	
Ⓑ	XSB4 + 6	
Ⓒ	XSN3 + W6FZ	

9. ACCESSORIES AND PACKING MATERIALS



10. REPLACEMENT PARTS LIST

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item.
After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.
After the end of this period, the assembly will no longer be available.
2. Important safety notice / Components identified by  mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.
3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.
4. ISO code (Example : ABS-HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.
5. RESISTORS & CAPACITORS / Unless otherwise specified; / All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω / All capacitors are in MICRO FARADS (μ F) P= μ μ F / *Type & Wattage of Resistor

Type				
ERC:Solid		ERX:Metal Film	PQRD:Carbon	
ERD:Carbon		ERG:Metal Oxide	PQRQ:Fuse	
PQ4R:Chip		ERO:Metal Film	ERF:Wire Wound	
Wattege				
10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W 5:5W
ECFD:Semi-Conductor		ECCD,ECKD,PQCB,PQVP : Ceramic		
ECQS:Styrol		ECQM,ECQV,ECQE,ECQU,ECQB : Polyester		
PQCBX,ECUV:Chip		ECEA,ECSZ,ECOS : Electrolytic		
ECMS:Mica		ECQP : Polypropylene		
Voltage				
ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H : 50V	05 : 50V	OF : 3.15V	OJ : 6.3V	1V : 35V
2A : 100V	1 : 100V	1A : 10V	1A : 10V	50,1H : 50V
2E : 250V	2 : 200V	1V : 35V	1C : 16V	1J : 63V
2H : 500V		OJ : 6.3V	1E,25 : 25V	2A : 100V

10.1. CABINET AND ELECTRICAL PARTS


10.1.1. OPERATION PANEL SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
<u>1</u>	PFGP1213S	PANEL, LCD	PC-HB
<u>2</u>	Not Used		
<u>3</u>	Not Used		
<u>4</u>	PFBX1171Z2	PUSH BUTTON, DIAL	S ABS-HB
<u>5</u>	PFKR1025Z2	GUIDE, DOCUMENT (LEFT)	S ABS-HB
<u>6</u>	PFUS1170Z	SPRING, DOCUMENT LEVER	
<u>7</u>	PFGG1172Z2	GRILLE, OPERATION PANEL	S PS-HB
<u>8</u>	PFKR1026Z2	GUIDE, DOCUMENT (RIGHT)	S ABS-HB
<u>9</u>	PFDG1015Y	GEAR, DOCUMENT GUIDE	POM-HB
<u>10</u>	PFJE1029Z	LEAD WIRE	
<u>11</u>	PFJE1006Z	LEAD WIRE	
<u>12</u>	PFDE1096Z	LEVER, DOCUMENT DETECTION	
<u>13</u>	PFDE1100Z	LEVER, READ DETECTION	POM-HB
<u>14</u>	PFUV1052Y	COVER, OPERATION	PS-HB
<u>15</u>	PQDR9685Y	ROLLER, SUPPORT	POM-HB
<u>16</u>	PFUS1171Z	SPRING, ROLLER	
<u>17</u>	PFDJ1017Z	SHAFT	
<u>18</u>	PFDJ1020Z	SPACER, PLATEN (LEFT)	POM-HB
<u>19</u>	PFDN1033Z	ROLLER, PLATEN	
<u>20</u>	PFDG1123Z	GEAR, PLATEN	POM-HB
<u>21</u>	PFHG1064Z	RUBBER PARTS, SEPARATION	
<u>22</u>	Not Used		
<u>23</u>	PFUS1173Z	SPRING, DOCUMENT FEED	
<u>24</u>	PFHX1251Z	PLASTIC PARTS, READING SHEET	
<u>25</u>	PFDJ1021Z	SPACER, PLATEN (RIGHT)	POM-HB
<u>26</u>	PFBX1172Z1	PUSH BUTTON, FUNCTION NAVI	S ABS-HB
<u>27</u>	PFBX1173Z2	PUSH BUTTON, COPY/STOP	S ABS-HB
<u>28</u>	PFBC1094Z1	PUSH BUTTON, START	S ABS-HB
<u>29</u>	PFUS1222Z	SPRING, SLIDER	
<u>30</u>	PFKS1070Z2	TRAY, DOCUMENT	

10.1.2. UPPER CABINET/THERMAL HEAD SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
50	PFKM1049Z2	CABINET BODY, HANDSET CRADLE	S PS-HB
51	PFHR1132Z	COVER, HEAD	PS-HB
52	PFDE1180Z	GUIDE, HEAD (LEFT)	POM-HB
53	PFJHS026Z	PRINTER UNITS, THERMAL HEAD	
54	PFDE1181Z	GUIDE, HEAD (RIGHT)	POM-HB
55	PFBH1011Y	PUSH BUTTON, HOOK	S ABS-HB
56	PFJS11Q45Z	CONNECTOR, 11 PIN	
57	PFDJ1018Z	COVER, ROLLER HOLDER	POM-HB
58	PFDN1032Z	ROLLER, DOCUMENT FEED	
59	PFDG1122Z	GEAR, EXIT ROLLER	POM-HB
60	PFQT1908Z	INDICATION LABEL, PAPER CAUTION	
61	PFUS1172Y	SPRING, THERMAL HEAD	
62	PFDE1102Z1	LEVER, LOCK	S POM-HB
63	PFJS02Q64Z	CONNECTOR, 2 PIN	
64	PFA50P006Z	SPEAKER	
65	PFUS1179Z	SPRING, LOCK LEVER	
66	PFHE1019Z	INSULATOR, IMAGE SENSOR FORM	
67	PFUS1176Z	TORSION SPRING, OPERATION PANEL OPEN	
68	PFKM1048T2	CABINET BODY, MAIN	S PS-HB
69	PFHX1268Y	PLASTIC PARTS, IMAGE SENSOR SHEET	
70	PFUS1181Z	SPRING, HEAD EARTH	
71	PFDJ1013Y	SPACER, ROLLER	POM-HB
72	PFDN1034Z	ROLLER, SEPARATION	
73	PQUS10055Z	SPRING, ONE WAY	S
74	PFDE1059Z	SPACER, DELAY	POM-HB
75	PFDG1124Z	GEAR, SEPARATION ROLLER	POM-HB
76	XUC2FY	RETAINING RING	
77	N2GBBE000001	PHOTO ELECTRIC TRANSDUCER, IMAGE SENSOR	S
78	PFJE1005Z	LEAD WIRE, IMAGE SENSOR	
79	PFGT2005Z-M	NAME PLATE	
80	Not Used		


10.1.3. LOWER SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
100	PFMD1039Y	FRAME, BOTTOM	
101	PFHA1001Z	RUBBER PARTS, LEGS	
102	PFJP03S04Z	CONNECTOR, 3 PIN	
103	PQLB1E1	INSULATOR, FERRITE CORE	
104	PFJS02Q82Z	CONNECTOR, 2 PIN	
105	XWC4B	WASHER	
106	PFUS1177Z	TORSION SPRING, EARTH	
107	PFJS08Q83Z	CONNECTOR, 8 PIN	
108	PFDE1097Z	LEVER, PAPER SENSOR	PBT-HB
109	PFUS1214Z	TORSION SPRING, ROLLER EARTH	
110	PFHX1555Z	PLASTIC PARTS, DIGITAL UNIT	
111	WLR18YK26CM	EARTH LEAD	
112	PQMX10010Z	SUMI TUBE	
113	KR06TT251508	FEPRITE CORE	
114	PQHR136Z	CLAMPER	
115	PFLB5K001	CORE	

10.1.4. GEAR CHASSIS SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
130	PFJQ1015Z	DC MOTOR	
131	PFMH1069Z	CHASSIS, MOTOR PLATE	
132	PFDG1119Y	GEAR, IDLER A	POM-HB
133	PFDE1095Z	ARM, RX	POM-HB
134	PFUS1062Z	COIL SPRING, GEAR C	
135	PFDG1021Z	GEAR, CAM	POM-HB
136	PFDG1022Z	GEAR, D	POM-HB
137	PFDE1094Z	ARM, TX	POM-HB
138	PFDG1121Z	GEAR, CAM	POM-HB
139	PQST2A04Z	SEESAW SWITCH, CAM SENSOR	
140	PFJS03Q43Z	CONNECTOR, 3 PIN	
141	PFUA1022Z	CHASSIS, GEAR	PBT+ABS-HB
142	PFUS1169Z	TORSION SPRING, ARM	
143	PFDG1120Z	GEAR, IDLER B	
144	PFHX1399Z	COVER, MOTOR SHEET	

10.1.5. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PFJXE0905Z	HANDSET	
A2	PFJA1029Z	CORD, HANDSET	
A3	PQJA10075Z	CORD, TELEPHONE	
A4	Not Used		
A5	PFJA1023Z	POWER CORD	
A6	PFQX1656Z	INSTRUCTION BOOK	
A7	PQPH10023Z	SHEET RECORDING PAPER (10M)	
P1	PFPE1264Z-M	GIFT BOX ASS'Y	
P2	PFPD1270Z	CUSHION, PAD (LEFT)	
P3	PFPN1271Z	CUSHION, PAD (RIGHT)	
P4	PFPD1089Y	CUSHION, UPPER	
P5	PQPH79Z	PROTECTION COVER	
P6	PQPP10005Z	PROTECTION COVER	

10.2. DIGITAL BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FT72SA	DIGITAL BOARD ASSY (RTL)	
PCB-1	PFLP1397SAZ	DIGITAL BOARD ASSY (RTL) (without ROM)	
		Refer to Lower/P.C.B SECTION	
		(ICS)	
IC1	PFVIT7E05A	IC	S
IC2	PFWIFT72SA	IC (ROM)	
IC3	PFVIMO525	IC	
IC4	PFVIS80842AN	IC	S
IC5	PFVITC35133F	IC	S
IC6	PQVITC4066BF	IC	S
IC7	PFVIT2003APS	IC	S
IC8	PQVINJM4558M	IC	S
IC9	PQVINJM4558M	IC	S
		(TRANSISTORS)	
Q1	2SB1197K	TRANSISTOR(SI)	S
Q2	2SA933	TRANSISTOR(SI)	S
Q3	2SD1819A	TRANSISTOR(SI)	S
Q4	2SD1819A	TRANSISTOR(SI)	S
Q6	PQVTDTC114EU	TRANSISTOR(SI)	S
Q7	2SB1322	TRANSISTOR(SI)	S
Q8	PQVTDTC114EU	TRANSISTOR(SI)	S
Q9	2SB1218A	TRANSISTOR(SI)	
Q10	2SD1819A	TRANSISTOR(SI)	S
Q11	2SD1819A	TRANSISTOR(SI)	S
Q13	PFVTSI4431DY	TRANSISTOR(SI)	S
Q14	PQVTDTC143E	TRANSISTOR(SI)	S
Q15	PQVTD143Z106	TRANSISTOR(SI)	S
Q16	PQVTDTC114EU	TRANSISTOR(SI)	S
Q17	2SB1218A	TRANSISTOR(SI)	
		(DIODES)	
D1	PQVDRLS73T	DIODE(SI)	
D2	PFVDRMRLS245	DIODE(SI)	S
D3	PQVD1N7200R	DIODE(SI)	
D7	PQVDRLS73T	DIODE(SI)	
		(CONNECTORS)	
CN3	PQJP5G30Y	CONNECTOR,5PIN	S
CN4	PQJP11G100Z	CONNECTOR,11PIN	
CN5	PQJP2G30Y	CONNECTOR,2PIN	S
CN6	PFJS06A13Z	CONNECTOR,6PIN	S
CN7	PFJS09A13Z	CONNECTOR,9PIN	
CN8	PFJS10A13Z	CONNECTOR,10PIN	S
CN9	PQJP17A19Z	CONNECTOR,17PIN	S
		(COILS)	
L18	PQLQR1RS102	COIL	S
		(BATTERY)	
BAT1	PFSU1004Z	BATTERY	S
		(COMPONENTS PARTS)	

Ref. No.	Part No.	Part Name & Description	Remarks
RA1	D1H81518A001	COMPONENTS PARTS	
RA2	D1H81518A001	COMPONENTS PARTS	
RA3	D1H81518A001	COMPONENTS PARTS	
RA4	D1H81518A001	COMPONENTS PARTS	
RA5	D1H81518A001	COMPONENTS PARTS	
		(CRYSTAL OSCILLATORS)	
X1	PFVCCFS32Z	CRYSTAL OSCILLATOR	S
X2	PFVC2073FZAT	CRYSTAL OSCILLATOR	S
X3	PFVBKB240ZAT	CRYSTAL OSCILLATOR	S
		(CERAMIC FILTER)	
L1	PFVF1A121ST	CERAMIC FILTER	
L2	PFVF1A121ST	CERAMIC FILTER	
		(FUSE)	
F2	PFRB001251KC	FUSE	S
F3	PFRB0031125T	FUSE RESISTOR	S
F4	PFRB001251KC	FUSE	S
		(JACK)	
IC2	PFJS32A11Z	JACK/SOCKET	S
		(RESISTORS)	
C94	ERJ3GEY0R00	0	
F1	ERDS1VJ000	0	S
J11	ERJ3GEY0R00	0	
L4	ERJ3GEYJ101	100	
L5	ERJ3GEYJ101	100	
L6	ERJ3GEYJ101	100	
L7	ERJ3GEYJ101	100	
L8	ERJ3GEYJ101	100	
L9	ERJ3GEYJ101	100	
L10	ERJ3GEYJ101	100	
L11	ERJ3GEYJ101	100	
L12	ERJ3GEY0R00	0	
L13	ERJ3GEY0R00	0	
L14	ERJ3GEYJ101	100	
L15	ERJ3GEYJ101	100	
L17	ERJ3GEY0R00	0	
L19	ERJ3GEY0R00	0	
L20	ERJ3GEY0R00	0	
L22	ERJ3GEY0R00	0	
L25	ERJ3GEY0R00	0	
R1	ERJ3GEYJ473	47K	
R2	ERJ3GEY0R00	0	
R6	ERJ3GEY0R00	0	
R7	ERJ3GEYJ103	10K	
R8	ERJ3GEYJ472	4.7K	
R9	ERJ3GEYJ472	4.7K	
R10	ERJ3GEYJ271	270	
R11	ERJ3GEYJ151	150	
R12	ERJ3GEYJ151	150	
R13	ERJ3GEYJ102	1K	

Ref. No.	Part No.	Part Name & Description	Remarks
R14	ERJ3GEYJ222	2.2K	
R17	ERJ3GEYJ103	10K	
R18	ERJ3GEYJ222	2.2K	
R19	ERJ3GEYJ122	1.2K	
R20	ERJ3GEYJ821	820	
R21	ERJ3GEYJ472	4.7K	
R22	ERJ3GEYJ912	9.1K	
R24	ERJ3GEYJ103	10K	
R25	ERJ3GEYJ103	10K	
R26	ERJ3GEYJ331	330	
R27	ERJ3GEYJ104	100K	
R28	ERJ3GEYJ124	120K	
R29	ERJ3GEYJ105	1M	
R30	ERJ3GEY0R00	0	
R32	ERJ3GEYJ103	10K	
R33	ERJ3GEYJ102	1K	
R34	ERJ3GEYJ105	1M	
R35	ERJ3GEYJ563	56K	
R36	ERJ3GEYJ103	10K	
R37	ERJ3GEYJ243	24K	
R38	ERJ3GEYJ243	24K	
R39	ERJ3GEYJ753	75K	
R40	ERJ3GEYJ473	47K	
R42	ERJ3GEYJ433	43K	
R43	ERJ3GEYJ224	220K	
R44	ERJ3GEYJ395	3.9M	
R46	ERJ3GEYJ123	12K	
R49	ERJ3GEYJ683	68K	
R51	ERJ3GEYJ103	10K	
R52	ERJ3GEYJ224	220K	
R53	ERJ3GEYJ154	150K	
R54	ERJ3GEYJ105	1M	
R57	ERJ3GEYJ103	10K	
R58	ERJ3GEYJ472	4.7K	
R59	ERJ3GEYJ394	390K	
R60	ERJ3GEYJ562	5.6K	
R62	ERJ3GEYJ393	39K	
R63	ERJ3GEYJ821	820	
R64	ERDS1TJ222	2.2K	S
R66	ERJ3GEYJ563	56K	
R67	ERJ3GEY0R00	0	
R68	ERJ3GEY0R00	0	
R69	ERJ3GEYJ101	100	
R70	ERJ3GEYJ101	100	
R71	ERJ3GEYJ101	100	
R72	ERJ3GEYJ153	15K	
R73	ERJ3GEYJ203	20K	
R74	ERJ3GEYJ562	5.6K	
R75	ERJ3GEYJ472	4.7K	
R77	ERJ3GEYJ472	4.7K	
R78	ERJ3GEYJ102	1K	
R80	ERJ3GEYJ151	150	
R81	ERJ3GEYJ470	47	
R82	ERJ3GEYJ2R2	2.2	

Ref. No.	Part No.	Part Name & Description	Remarks
R85	ERJ3GEYJ222	2.2K	
R86	ERJ3GEYJ472	4.7K	
R87	ERJ3GEYJ224	220K	
R88	ERJ3GEYJ224	220K	
R89	ERJ3GEYJ103	10K	
R90	ERJ3GEYJ224	220K	
R91	ERJ3GEYJ224	220K	
R92	ERJ3GEYJ222	2.2K	
R93	ERJ3GEYJ473	47K	
R98	ERJ3GEYJ102	1K	
R99	ERJ3GEY0R00	0	
R102	ERJ3GEYJ821	820	
R103	ERJ3GEYJ821	820	
R104	ERJ3GEYJ821	820	
R107	ERJ3GEYJ102	1K	
R108	ERJ3GEYJ102	1K	
R109	ERJ3GEYJ102	1K	
R110	ERJ3GEYJ102	1K	
R112	ERJ3GEYJ101	100	
R113	ERJ3GEYJ102	1K	
R116	ERJ3GEYJ101	100	
R117	ERJ3GEYJ102	1K	
R119	ERJ3GEYJ101	100	
R120	ERJ3GEYJ102	1K	
R121	ERJ3GEYJ102	1K	
R131	ERJ3GEYJ682	6.8K	
R132	ERJ3GEYJ563	56K	
R133	ERJ3GEYJ222	2.2K	
R134	ERJ3GEYJ471	470	
R135	ERJ3GEYJ151	150	
		(CAPACITORS)	
J13	PQCUV1H104ZF	CERAMIC CAPACITOR	S
C1	ECUV1E104ZFB	0.1	
C2	ECUV1E104ZFB	0.1	
C3	ECUV1E104ZFB	0.1	
C4	ECUV1C104KBV	0.1	
C6	ECUV1E104ZFB	0.1	
C8	ECUV1E104ZFB	0.1	
C10	ECUV1E104ZFB	0.1	
C11	ECUV1E104ZFB	0.1	
C12	ECUV1E104ZFB	0.1	
C13	ECUV1H120JCV	12P	
C14	ECUV1H150JCV	15P	
C15	ECUV1H102KBV	0.001	
C17	ECUV1E104ZFB	0.1	
C18	ECUV1H102KBV	0.001	
C20	ECUV1E104ZFB	0.1	
C21	ECUV1E104ZFB	0.1	
C23	ECUV1E104ZFB	0.1	
C24	ECEA1CK101	100	S
C26	ECUV1E104ZFB	0.1	
C27	ECUV1C104KBV	0.1	
C28	ECUV1E104ZFB	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C29	ECUV1H100DCV	10P	S
C30	ECUV1E104ZFB	0.1	
C31	ECUV1E104ZFB	0.1	
C32	ECUV1E104ZFB	0.1	
C33	ECUV1C224ZFB	0.22	S
C34	ECEA1CK101	100	S
C35	ECUV1E104ZFB	0.1	
C36	ECEA1CK101	100	S
C38	ECUV1H221JCV	220P	
C39	ECUV1H150JCV	15P	
C40	ECEA1HKS100	10	S
C41	ECUV1E104ZFB	0.1	
C42	ECUV1H102KBV	0.001	
C43	ECUV1C104KBV	0.1	
C44	ECUV1H220JCV	22P	
C45	ECUV1C104KBV	0.1	
C46	ECUV1E104ZFB	0.1	
C47	ECUV1H220JCV	22P	
C48	ECUV1C104KBV	0.1	
C49	ECUV1H220JCV	22P	
C50	ECUV1H222KBV	0.0022	
C51	ECUV1H221JCV	220P	
C52	ECUV1C104KBV	0.1	
C53	ECUV1C104KBV	0.1	
C54	ECUV1H222KBV	0.0022	
C55	ECUV1E104ZFB	0.1	
C56	ECUV1H182KBV	0.0018	
C58	ECUV1C104KBV	0.1	
C60	ECUV1C104KBV	0.1	
C61	ECUV1H471JCV	470P	S
C62	ECUV1C104KBV	0.1	
C63	ECUV1C104KBV	0.1	
C64	ECUV1H101JCV	100P	
C65	ECUV1C104KBV	0.1	
C66	ECUV1C104KBV	0.1	
C67	ECUV1C104KBV	0.1	
C69	ECUV1H100DCV	10P	S
C72	ECUV1H100DCV	10P	S
C73	ECUV1H100DCV	10P	S
C74	ECUV1H222KBV	0.0022	
C75	ECUV1H561KBV	560P	
C77	ECUV1C104KBV	0.1	
C78	ECUV1H102KBV	0.001	
C79	ECEA1CK101	100	S
C80	ECUV1E104ZFB	0.1	
C82	PQCUV1H104ZF	0.1	S
C83	ECUV1E104ZFB	0.1	
C85	ECEA1EKA100	10	
C90	ECUV1E104ZFB	0.1	
C91	ECUV1E104ZFB	0.1	
C92	ECUV1E104ZFB	0.1	
C95	ECUV1H181JCV	180P	
C98	ECUV1H102KBV	0.001	
C99	ECUV1H102KBV	0.001	

Ref. No.	Part No.	Part Name & Description	Remarks
C100	ECUV1H102KBV	0.001	
C101	ECUV1H102KBV	0.001	
C105	ECUV1E104ZFB	0.1	

10.3. ANALOG BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFLP1295BXZ	ANALOG BOARD ASS'Y (RTL)	(!)
		(ICS)	
IC1	PQVIMC34119D	IC	S
IC2	PFVINJM2904M	IC	S
		(TRANSISTORS)	
Q2	2SD1819A	TRANSISTOR(SI)	S
Q3	PQVTDTC143E	TRANSISTOR(SI)	S
Q4	PQVTDTC114EU	TRANSISTOR(SI)	S
Q5	2SC2235	TRANSISTOR(SI)	S
Q6	2SB1218A	TRANSISTOR(SI)	
Q11	PQVTDTC114EU	TRANSISTOR(SI)	S
Q12	PQVTDTC114EU	TRANSISTOR(SI)	S
		(DIODES)	
D1	PFVDDGS1ZB60	DIODE(SI)	
D2	1SS133	DIODE(SI)	S
D6	1SS133	DIODE(SI)	S
D8	1SS133	DIODE(SI)	S
D9	1SS133	DIODE(SI)	S
D11	MA4056	DIODE(SI)	
D12	MA4056	DIODE(SI)	
		(JACKS AND CONNECTOR)	
CN1	PQJS17A10Z	CONNECTOR	S
CN2	PQJP02G100Z	CONNECTOR	
CN3	PQJJ1TB18Z	JACK/SOCKET	S
CN4	PQJJ1T004Z	JACK/SOCKET	S
CN5	PQJJ1T004Z	JACK/SOCKET	S
		(SWITCHES)	
SW1	PFSH1A03Z	PUSH SWITCH	S
SW2	ESE14A211	PUSH SWITCH	
		(COILS)	
L1	PQLQR2KA213	COIL	S
L2	PQLQR2KA213	COIL	S
L3	PQLQR2KA213	COIL	S
L4	PQLQR2KA213	COIL	S
L5	PQLQR1RS102	COIL	S
L6	PQLQR1RS102	COIL	S
L7	PQLQR1RS102	COIL	S
L8	PQLQR1RS102	COIL	S
L11	PQLQR2KA213	COIL	S
L12	PQLQR2KA213	COIL	S

Ref. No.	Part No.	Part Name & Description	Remarks
		(PHOTO ELECTRIC TRANSDUCERS)	
PC1	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER	S (!)
PC4	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	S (!)
PC5	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	S (!)
		(RELAY)	
RL1	PFSL003Z	RELAY	S (!)
		(VARISTORS)	
SA1	PQVDDSS301L	VARISTOR	S
SA2	PFRZ001Z	VARISTOR	S (!)
ZNR1	ERZVA7D151	VARISTOR	
		(TRANSFORMER)	
T1	PFLT8E003	TRANSFORMER	S (!)
		(THERMISTOR)	
POS1	PQRPAR390N	THERMISTOR	S
		(RESISTORS)	
R1	ERJ3GEYJ101	100	
R2	ERJ3GEYJ472	4.7k	
R3	ERJ3GEYJ101	100	
R4	ERJ3GEYJ472	4.7k	
R9	ERJ3GEYJ102	1k	
R10	ERJ3GEYJ153	15k	
R11	ERJ3GEYJ562	5.6k	
R12	ECEA1HN010S	1	
R16	ERDS1TJ473	47k	S
R17	ERDS1TJ183	18k	S
R18	ERJ3GEYJ273	27k	S
R21	ERDS1TJ330	33	
R22	ERJ3GEYJ203	20k	
R23	ERJ3GEYJ103	10k	S
R24	ERJ3GEYJ392	3.9k	
R25	ERJ3GEYJ152	1.5k	
R26	ERJ3GEYJ103	10k	
R31	ERDS2TJ102	1k	
R32	ERDS2TJ271	270	
R33	ERJ3GEYJ563	56k	
R34	ERJ3GEYJ563	56k	S
R35	ERJ3GEYJ683	68k	S
R36	ERJ3GEYJ683	68k	
R37	ERDS2TJ222	2.2k	
R38	ERJ3GEYJ271	270	
R39	ERJ3GEYJ102	1k	
R41	ERJ3GEY0R00	0	S
R42	ERJ3GEYJ102	1k	
R45	ERJ3GEYJ331	330	
R46	ERJ3GEYJ152	1.5k	
R47	ERJ3GEYJ152	1.5k	
R48	ERJ3GEYJ682	6.8k	
R49	ERJ3GEYJ682	6.8k	

Ref. No.	Part No.	Part Name & Description	Remarks
R50	ERJ3GEYJ754	750k	
R51	ERJ3GEYJ224	220k	
R52	ERJ3GEYJ222	2.2k	
R53	ERJ3GEYJ103	10k	
R54	ERJ3GEYJ105	1M	
R55	ERJ3GEYJ273	27k	
R61	ERDS2TJ220	22	
R62	ERJ3GEYJ473	47k	
R63	ERJ3GEYJ331	330	
R64	ERJ3GEYJ103	10k	
R65	ERJ3GEYJ105	1M	S
R66	ERJ3GEYJ393	39k	
R67	ERJ3GEYJ103	10k	
R72	ERJ3GEYJ154	150k	
R73	ERJ3GEYJ114	110k	
R74	ERJ3GEYJ103	10k	
R75	ERJ3GEYJ153	15k	
R80	ERJ3GEYJ103	10k	
R81	ERJ3GEYJ622	6.2k	
		(CAPACITORS)	
C1	ECUV1H103KBV	0.01	
C2	ECUV1H103KBV	0.01	
C5	ECKD2H681KB	680P	S
C6	ECKD2H681KB	680P	S
C7	ECEA1HKS100	10	S
C11	ECQE2E105KZ	1	S
C15	ECUV1H103KBV	0.01	
C16	ECEA1CKS100	10	S
C20	ECUV1H103KBV	0.01	
C21	ECUV1C104KBV	0.1	
C23	ECUV1H153KBV	0.015	
C24	ECUV1H153KBV	0.015	
C25	ECUV1H101JCV	100P	
C26	ECUV1E104ZFV	0.1	
C30	ECEA1HKA4R7	4.7	
C32	ECUV1C104KBV	0.1	
C33	ECUV1C823KBV	0.082	
C43	ECUV1H102KBV	0.001	
C44	ECEA1HKA4R7	4.7	
C46	ECUV1H103KBV	0.01	
C47	ECEA1CKS100	10	S
C48	ECEA1CKS470	47	S
C50	ECUV1H682KBV	0.0068	
C51	ECUV1H103KBV	0.01	
C52	ECUV1H103KBV	0.01	
C53	ECUV1C823KBV	0.082	
C54	ECUV1C823KBV	0.082	
C55	ECUV1H101JCV	100P	
C57	ECUV1C104KBV	0.1	
C58	ECEA1CKS470	47	S
C61	ECEA1CKS470	47	S

10.4. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFLP1399LAZ	OPERATION BOARD ASS'Y (RTL)	
		(IC)	
IC1	PQVIMC4051BF	IC	S
		(TRANSISTORS)	
Q1	PQVTDTA143EU	TRANSISTOR(SI)	S
Q2	PQVTDTA143EU	TRANSISTOR(SI)	S
Q3	PQVTDTA143EU	TRANSISTOR(SI)	S
		(DIODE)	
D1	1SS133	DIODE(SI)	S
		(CONNECTORS)	
CN1	PFJS09A13Z	CONNECTOR,9PIN	
CN2	PFJS06A13Z	CONNECTOR,6PIN	S
		(LIQUID CRYSTAL DISPLAY)	
CN3	PFAVM220	LIQUID CRYSTAL DISPLAY	
		(PHOTO ELECTRIC TRANSDUCERS)	
PS1	CNA1006N	PHOTO SENSOR	
PS2	CNA1006N	PHOTO SENSOR	
		(SWITCHES)	
SW6	EVQ11Y05B	SWITCH	
SW7	EVQ11Y05B	SWITCH	
SW8	EVQ11Y05B	SWITCH	
SW9	EVQ11Y05B	SWITCH	
SW10	EVQ11Y05B	SWITCH	
SW11	EVQ11Y05B	SWITCH	
SW12	EVQ11Y05B	SWITCH	
SW13	EVQ11Y05B	SWITCH	
SW14	EVQ11Y05B	SWITCH	
SW15	EVQ11Y05B	SWITCH	
SW16	EVQ11Y05B	SWITCH	
SW17	EVQ11Y05B	SWITCH	
SW18	EVQ11Y05B	SWITCH	
SW19	EVQ11Y05B	SWITCH	
SW20	EVQ11Y05B	SWITCH	
SW21	EVQ11Y05B	SWITCH	
SW22	EVQ11Y05B	SWITCH	
SW23	EVQ11Y05B	SWITCH	
SW24	EVQ11Y05B	SWITCH	
SW25	EVQ11Y05B	SWITCH	
SW26	EVQ11Y05B	SWITCH	
SW27	EVQ11Y05B	SWITCH	
SW28	EVQ11Y05B	SWITCH	
SW29	EVQ11Y05B	SWITCH	
SW30	EVQ11Y05B	SWITCH	

Ref. No.	Part No.	Part Name & Description	Remarks
SW31	EVQ11Y05B	SWITCH	
		(RESISTORS)	
R2	ERJ3GEYJ103	10k	
R3	ERJ3GEYJ103	10k	
R4	ERJ3GEYJ103	10k	
R5	ERJ3GEYJ103	10k	
R7	ERJ3GEYJ103	10k	
R10	ERJ3GEYJ103	10k	
R11	ERJ3GEYJ271	270	
R12	ERJ3GEYJ563	56k	
R13	ERJ3GEYJ103	10k	
R14	ERJ3GEYJ471	470	
R15	ERJ3GEYJ103	10k	
R16	ERJ3GEYJ471	470	
R17	ERJ3GEYJ103	10k	
R18	ERJ3GEYJ471	470	
R19	ERJ3GEYJ103	10k	
R20	ERJ3GEYJ471	470	
R28	ERJ3GEYJ103	10k	
R30	ERJ3GEYJ751	750	
R33	ERJ3GEYJ4R7	4.7	
		(CAPACITORS)	
C1	ECUV1E104ZFV	0.1	
C2	ECEA0JKS101	100	
C6	ECUV1C224ZFV	0.22	S

10.5. POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	PFLP1227EZL	POWER SUPPLY BOARD ASS'Y / (RTL)	⚠
		(ICS)	
IC101	PFVIFA5317P	IC	
IC201	AN1431T	IC	
IC202	PFVITA7805F	IC	S
		(TRANSISTORS)	
Q101	2SK2651	TRANSISTOR(SI)	⚠
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	S ⚠
D102	PFVD1N4005	DIODE(SI)	S ⚠
D103	PFVD1N4005	DIODE(SI)	S ⚠
D104	PFVD1N4005	DIODE(SI)	S ⚠
D105	PFVDEG01C	DIODE(SI)	S
D106	MA165	DIODE(SI)	
D107	MA4220	DIODE(SI)	
D108	PQVDERA1802	DIODE(SI)	S
D109	PQVDERA1506	DIODE(SI)	S
D201	PFVDSF5LC20U	DIODE(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
D202	PFVDD1NL20U	DIODE(SI)	S
		(CONNECTORS)	
CN31	PQJP2D98Z	CONNECTOR, 2PIN	⚠
CN301	PQJP8G30Z	CONNECTOR, 8PIN	⚠
		(COIL)	
L101	PFLES11V0523	COIL	⚠
		(RESISTORS)	
J8	PQ4R10XJ000	0	S
R101	ERDS1J1105	0	
R102	PQ4R10XJ823	82k	S
R103	PQ4R10XJ823	82k	S
R104	ERG2DJ204	200k	S
R105	ERX2SJR22	0.22	
R106	ERG1SJ470	47	
R107	PQ4R10XJ680	68	S
R108	ERDS2FJ150	15	
R109	ERDS2FJ100	10	
R110	ERG2DJ204	200k	S
R121	PQ4R10XJ103	10k	S
R122	PQ4R10XJ391	390	S
R123	PQ4R10XJ221	220	S
R125	PQ4R10XJ103	10k	S
R126	PQ4R10XJ562	5.6k	S
R127	PQ4R10XJ182	1.8k	S
R128	PQ4R10XJ124	120k	S
R129	PQ4R10XJ124	120k	S
R130	PQ4R10XJ154	150k	S
R131	PQ4R10XJ154	150k	S
R132	PQ4R10XJ154	150k	S
R133	PQ4R10XJ154	150k	S
R205	ERG2SJ681	680	S
R221	PQ4R10XJ222	2.2k	S
R222	PQ4R10XJ222	2.2k	S
R223	PQ4R10XJ101	100	S
R224	PQ4R10XJ273	27k	S
R225	PQ4R10XJ332	3.3k	S
		(PHOTO ELECTRIC TRANSDUCERS)	
PC101	0N3171	PHOTO ELECTRIC TRANSDUCER	⚠
		(CAPASITORS)	
C101	ECQU2A224MG	0.22	⚠
C102	ECQU2A104MV	0.1	⚠
C103	ECKNTS222ME	0.0022	⚠
C104	ECKNTS222ME	0.0022	⚠
C105	ECKNTS222ME	0.0022	⚠
C106	PFCEA400SX56	56	S
C107	ECKD3A470KBP	47P	
C108	ECKD3A102KBP	0.001	

Ref. No.	Part No.	Part Name & Description	Remarks
C109	ECA1VHG470	47P	
C121	ECUV1H472KBN	0.0047	
C122	ECUV1C224KBX	0.22	
C123	PQCUV1H681JC	680P	S
C124	ECUV1H104KBW	0.1	S
C201	EEUFA1V471	470	
C202	ECKD3A102KBP	0.001	
C203	PFCEA16A1000	1000	S
C204	PFCEA35A47M	47	S
C205	PFCEA50A1M	1	S
		(FUSE)	
F101	PFBABU215315	FUSE	S ⚠
		(COMPONENTS PARTS)	
L103	EXCELD35	COMPONENTS PARTS	
		(VARIABLE RESISTOR)	
VR201	EVNDJAA03B53	VARIABLE RESISTOR	
		(VARISTOR)	
ZNR101	ERZV10DK751U	VARISTOR	⚠
		(OTHERS)	
T101	ETS29AK428AC	TRANSFORMER	⚠
TH101	PFRRT09L8R2F	THERMISTOR	S

10.6. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description
EC1	PQZZ8K18Z	EXTENSION CABLE, 8 PIN
EC2	PFZZ17K2Z	EXTENSION CABLE, 17 PIN
EC3	PFZZ5K13Z	EXTENSION CABLE, 5 PIN
EC4	PFZZ11K13Z	EXTENSION CABLE, 11 PIN
EC5	PQZZ2K1Z	EXTENSION CABLE, 2 PIN
EC6	PFZZ6K1Z	EXTENSION CABLE, 6 PIN
EC7	PFZZ11K14Z	EXTENSION CABLE, 11 PIN
EC8	PFZZ10K4Z	EXTENSION CABLE, 10 PIN
EC9	PQZZ2K1Z	EXTENSION CABLE, 2 PIN
EC10	PFZZ2K2Z	EXTENSION CABLE, 2 PIN
	KM79811245C0	BASIC FACSIMILE TECHNIQUE

Notes:

Tools and Extension Cords are useful for servicing. / (They make servicing easy.)

11. PRINTED CIRCUIT BOARD

11.1. DIGITAL BOARD : COMPONENT VIEW

11.2. DIGITAL BOARD (PCB1) : BOTTOM VIEW

11.3. ANALOG BOARD (PCB2) : COMPONENT VIEW

11.4. ANALOG BOARD (PCB2) : BOTTOM VIEW

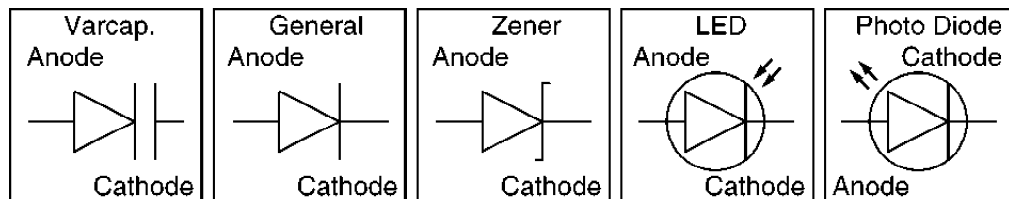
11.5. OPERATION BOARD (PCB3)

11.6. POWER SUPPLY BOARD (PCB4)

12. FOR THE SCHEMATIC DIAGRAMS

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.



Important safety notice

Components identified by \triangle mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

13. SCHEMATIC DIAGRAM

13.1. DIGITAL BOARD (PC1)

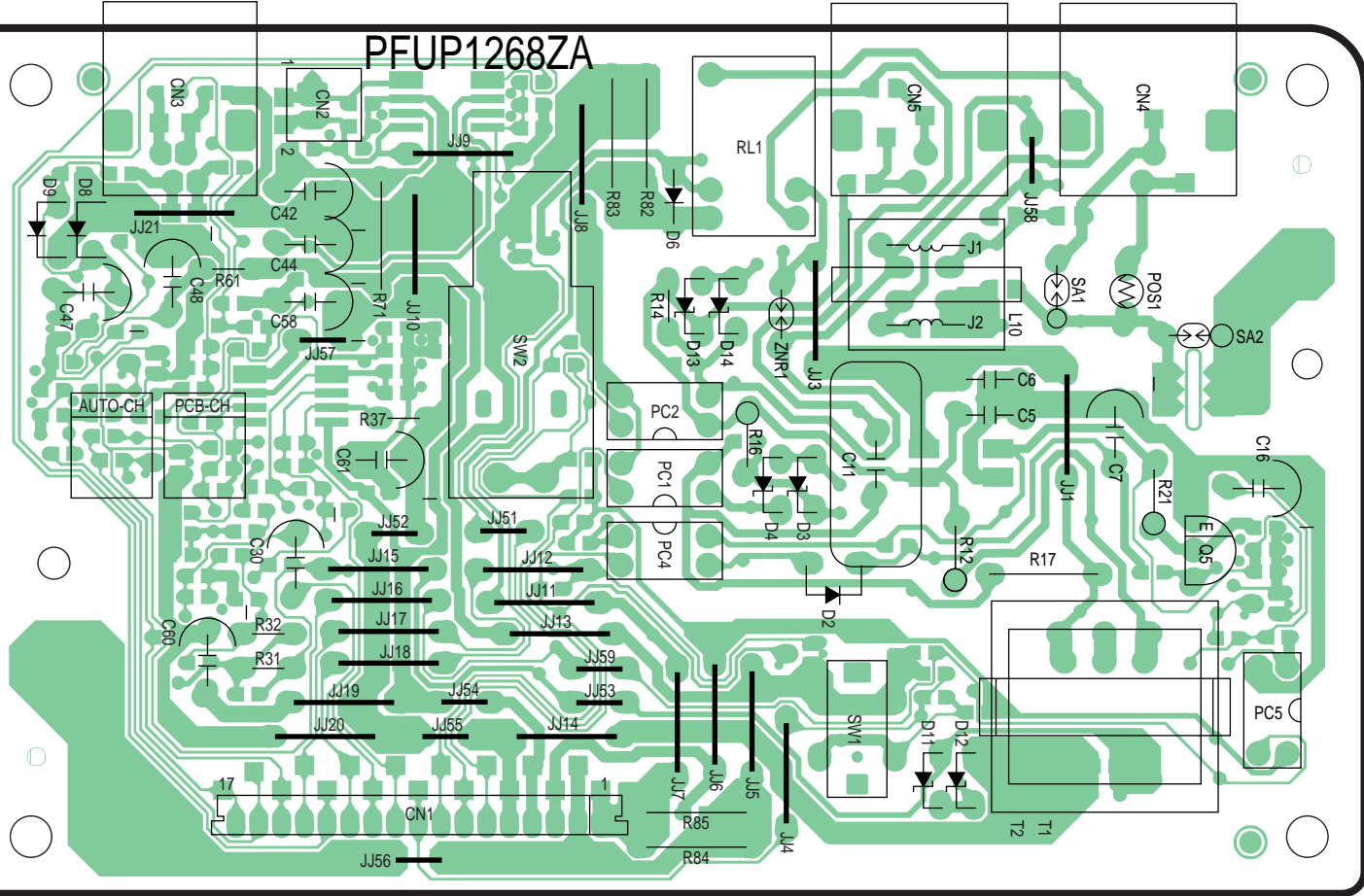
13.2. ANALOG CIRCUIT (PCB2)

13.3. OPERATION BOARD (PCB3)

13.4. POWER SUPPLY BOARD (PCB4)

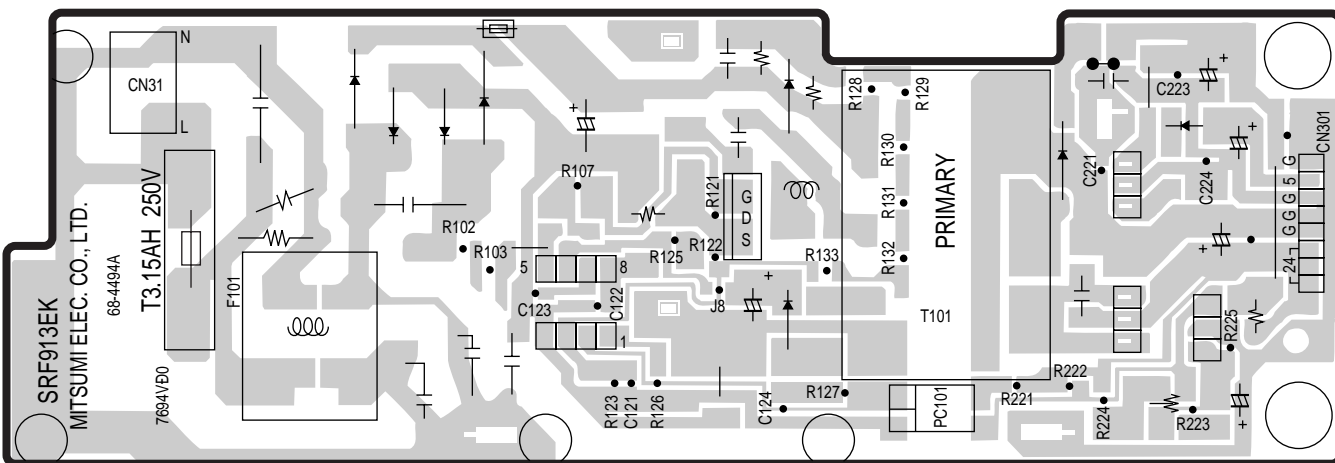
Y.M / KXFT72SAW / /

PFUP1268ZA

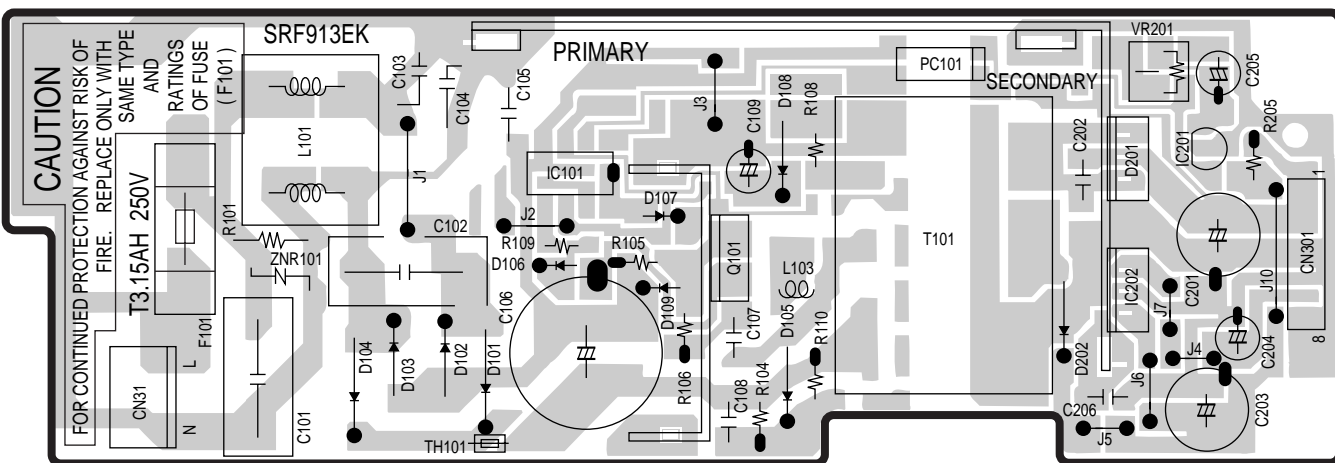


ANALOG BOARD (BOTTOM)
KX-FT72SA-W

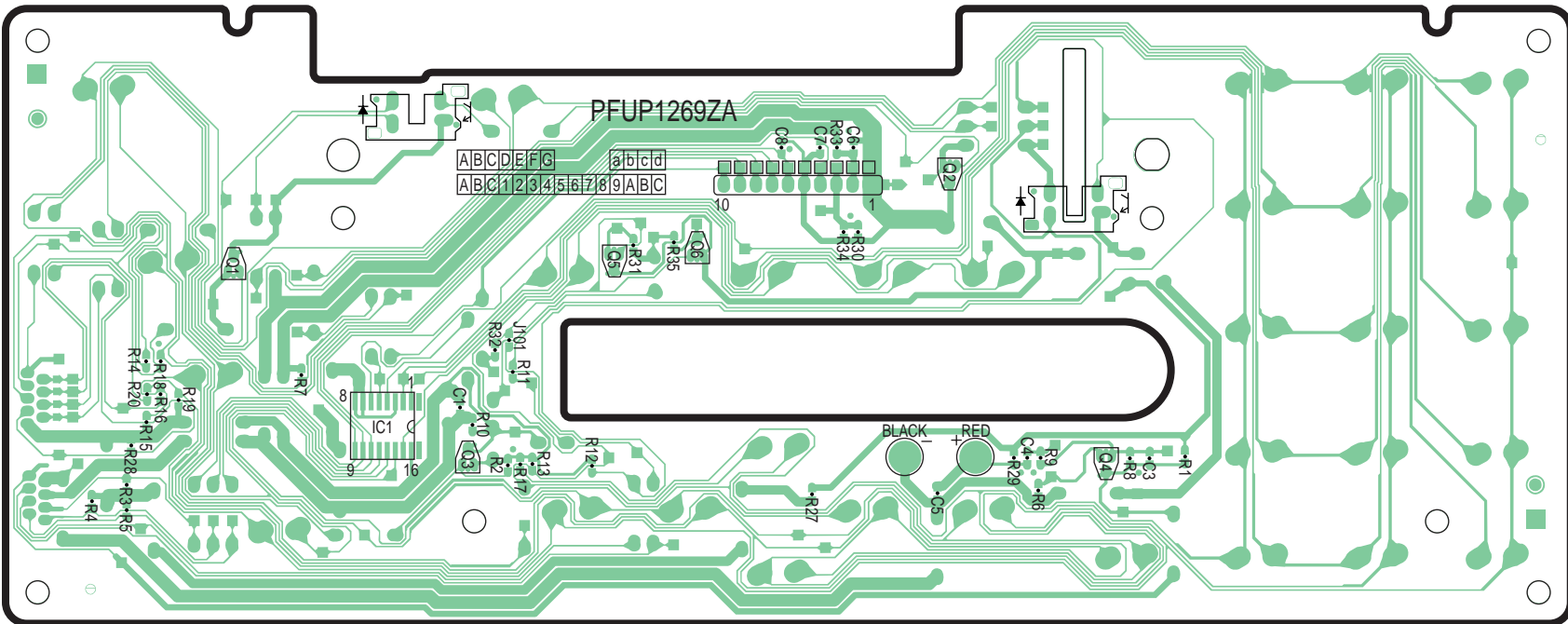
(BOTTOM VIEW)



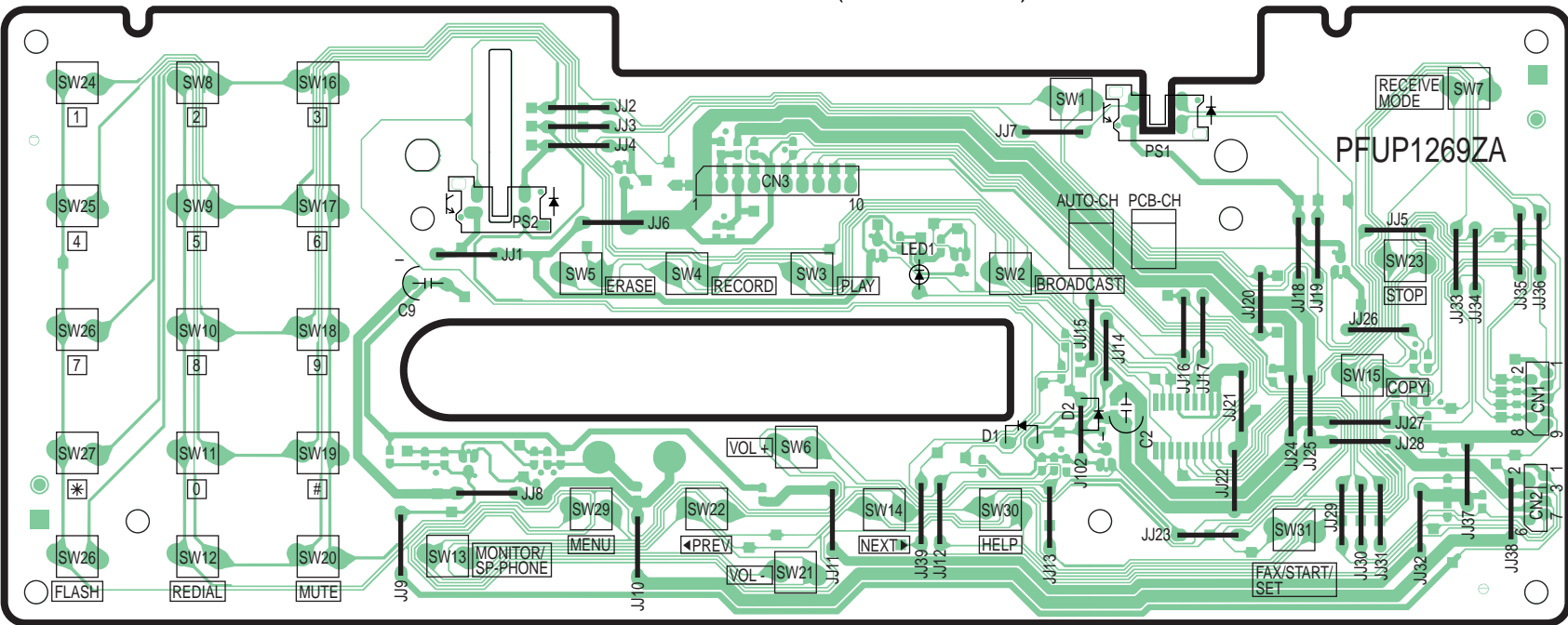
(BOTTOM VIEW)

POWER SUPPLY BOARD
KX-FT72SA-W

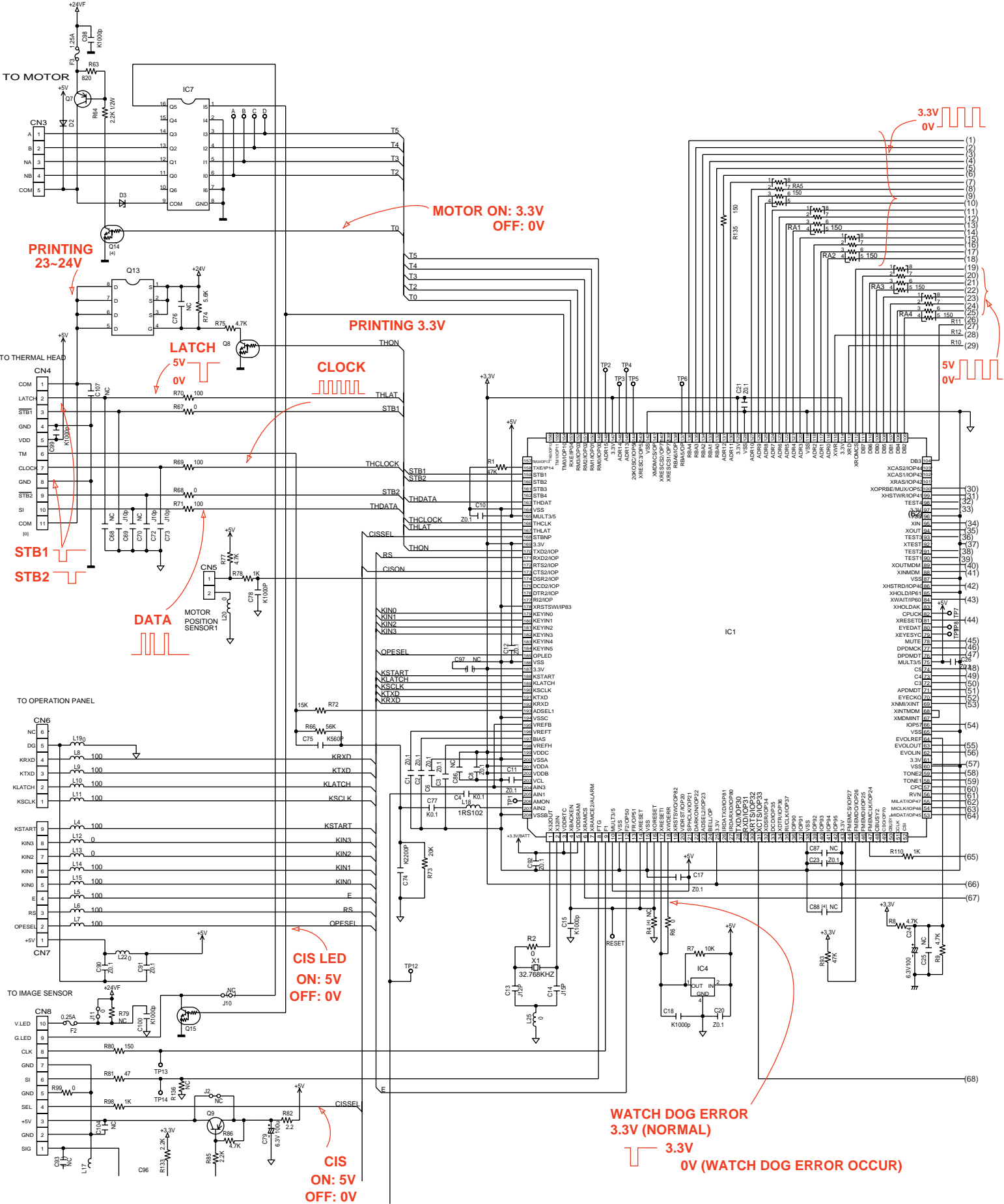
(COMPONENT VIEW)

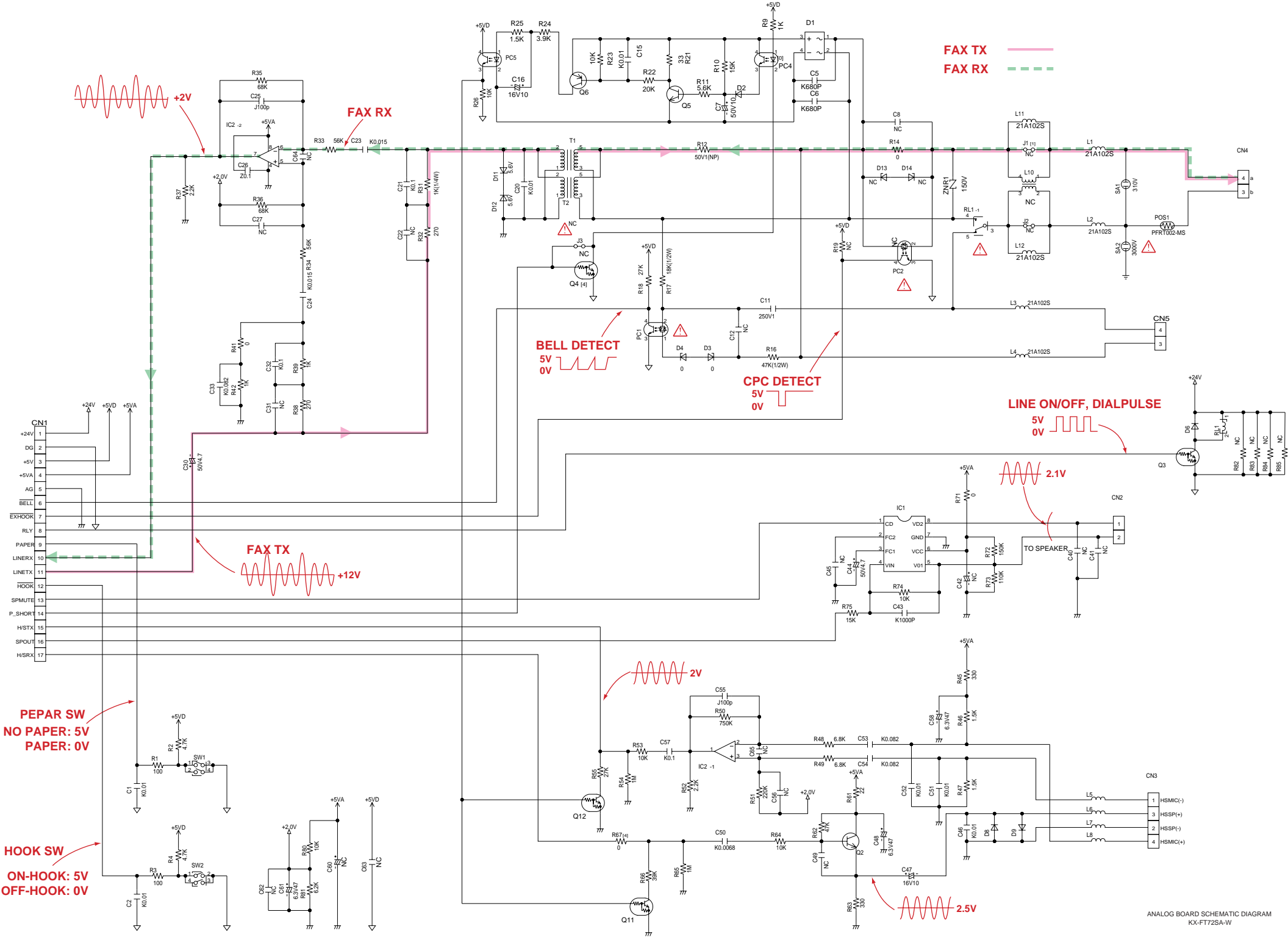


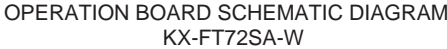
(BOTTOM VIEW)

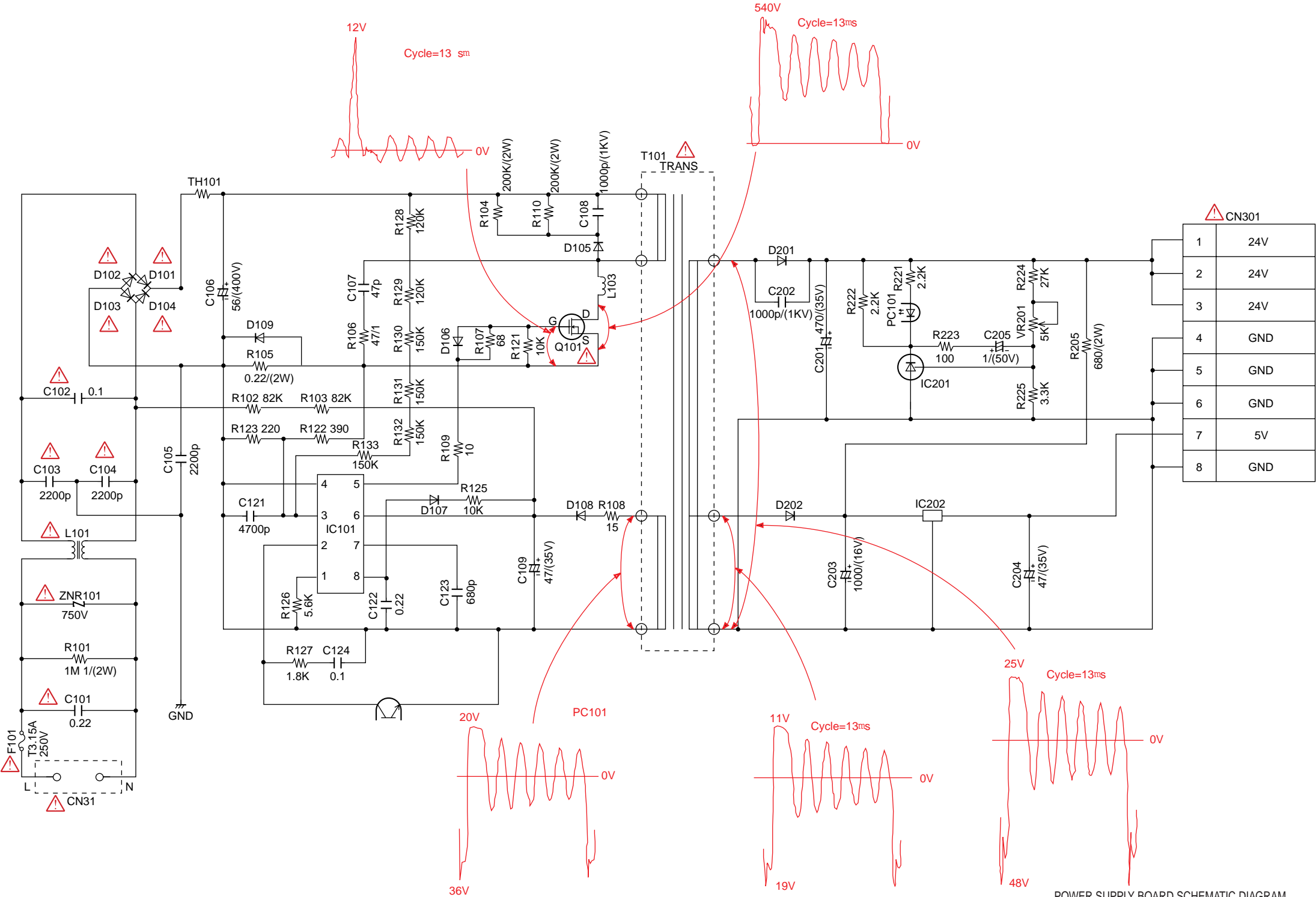


OPERATION BOARD
KX-FT72SA-W

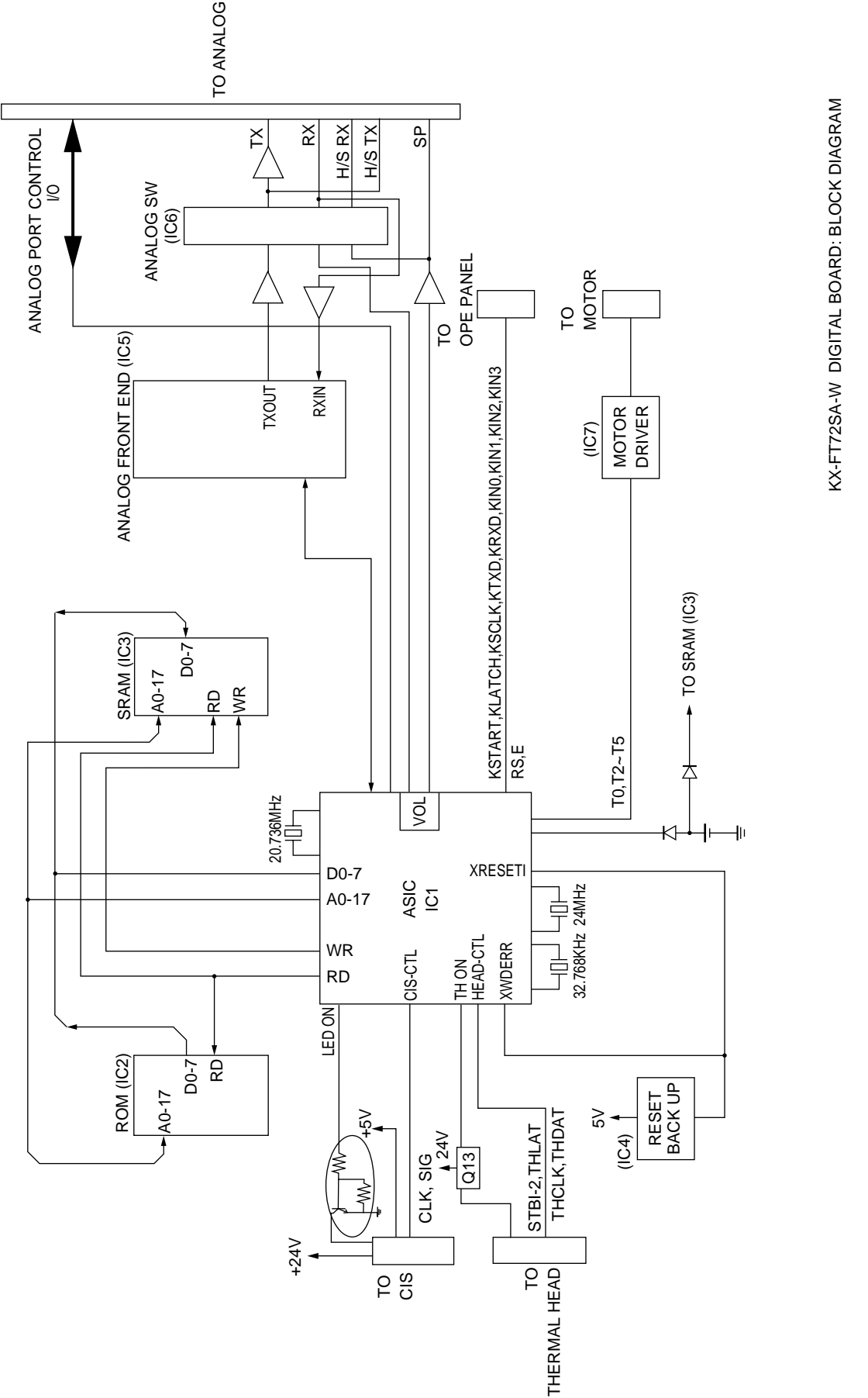


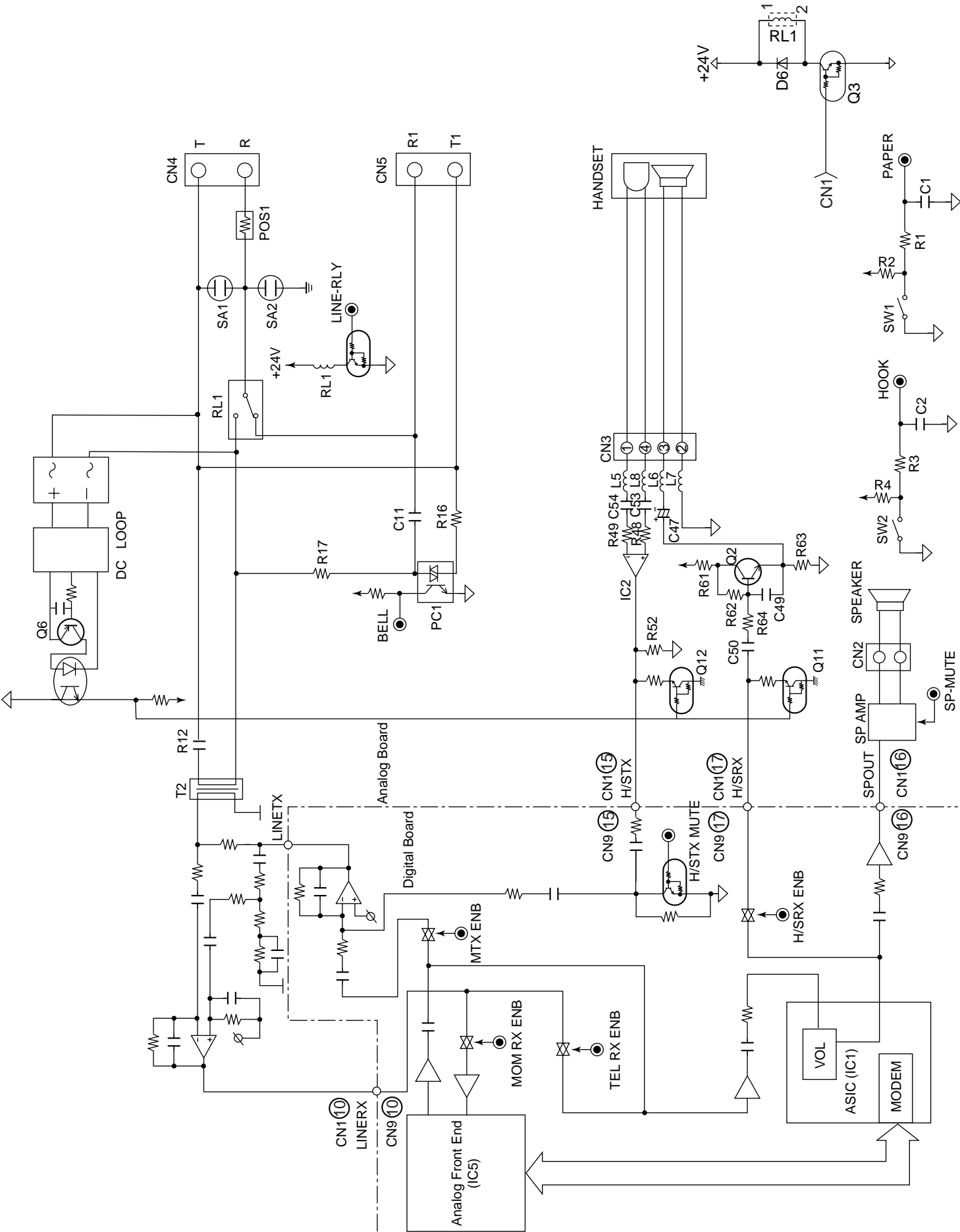


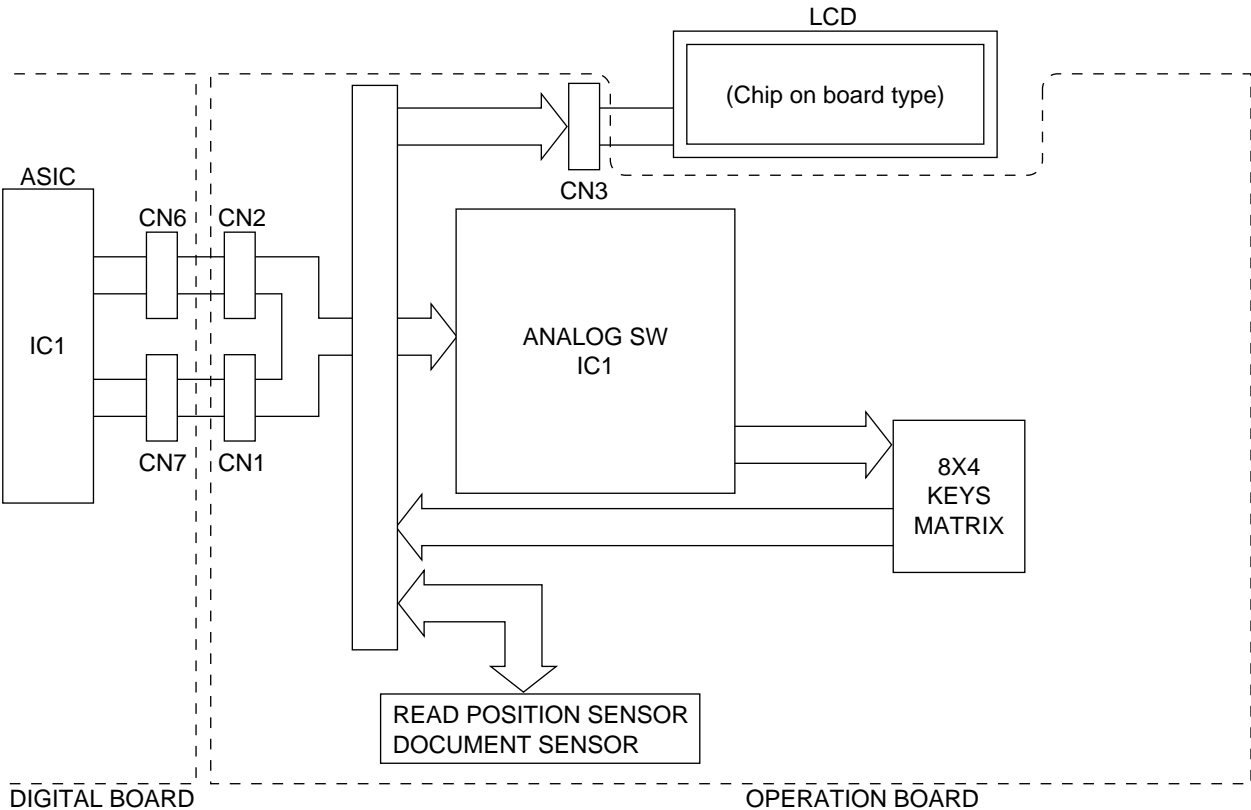


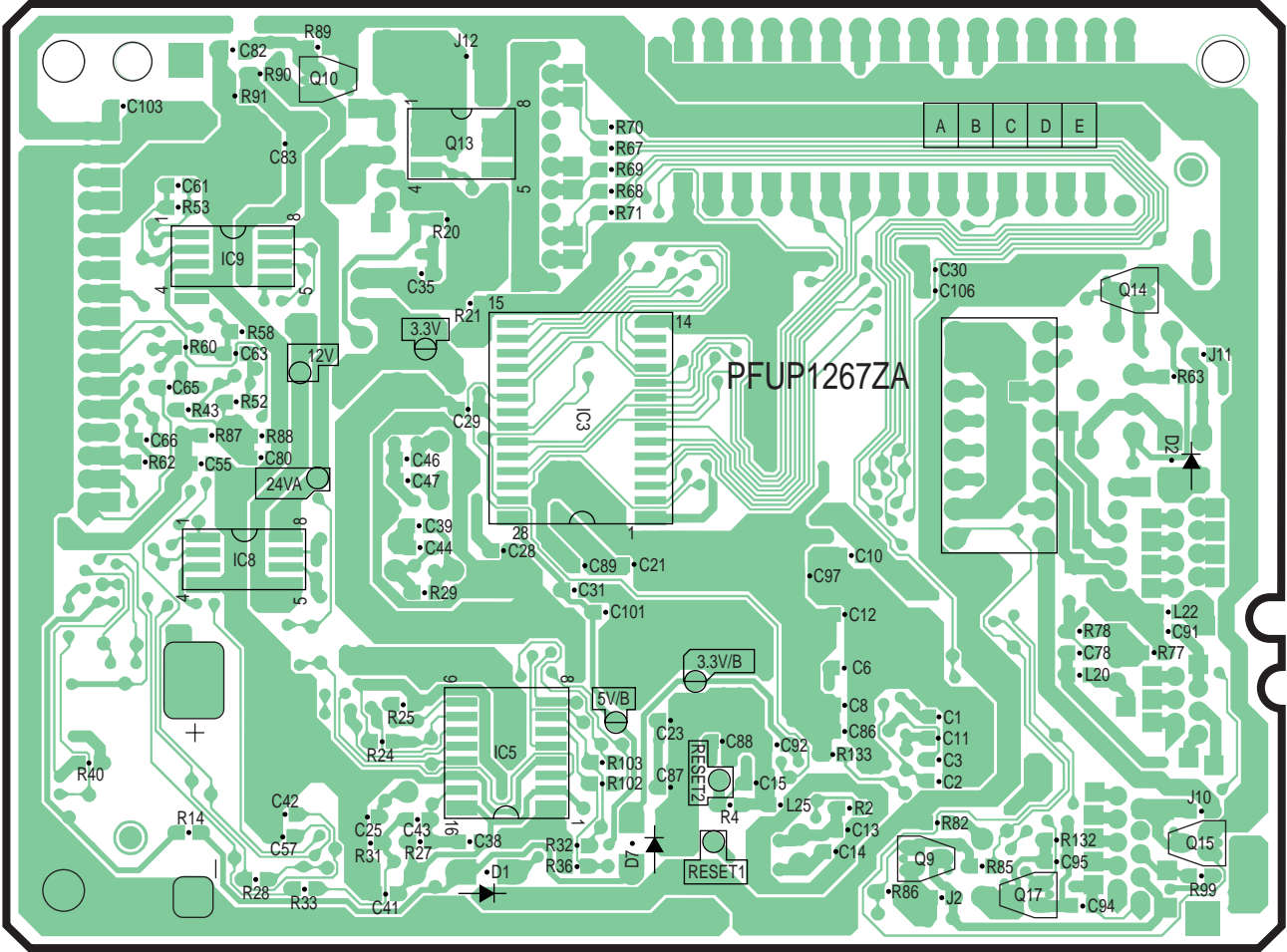


POWER SUPPLY BOARD SCHEMATIC DIAGRAM
KX-FT72SA-W

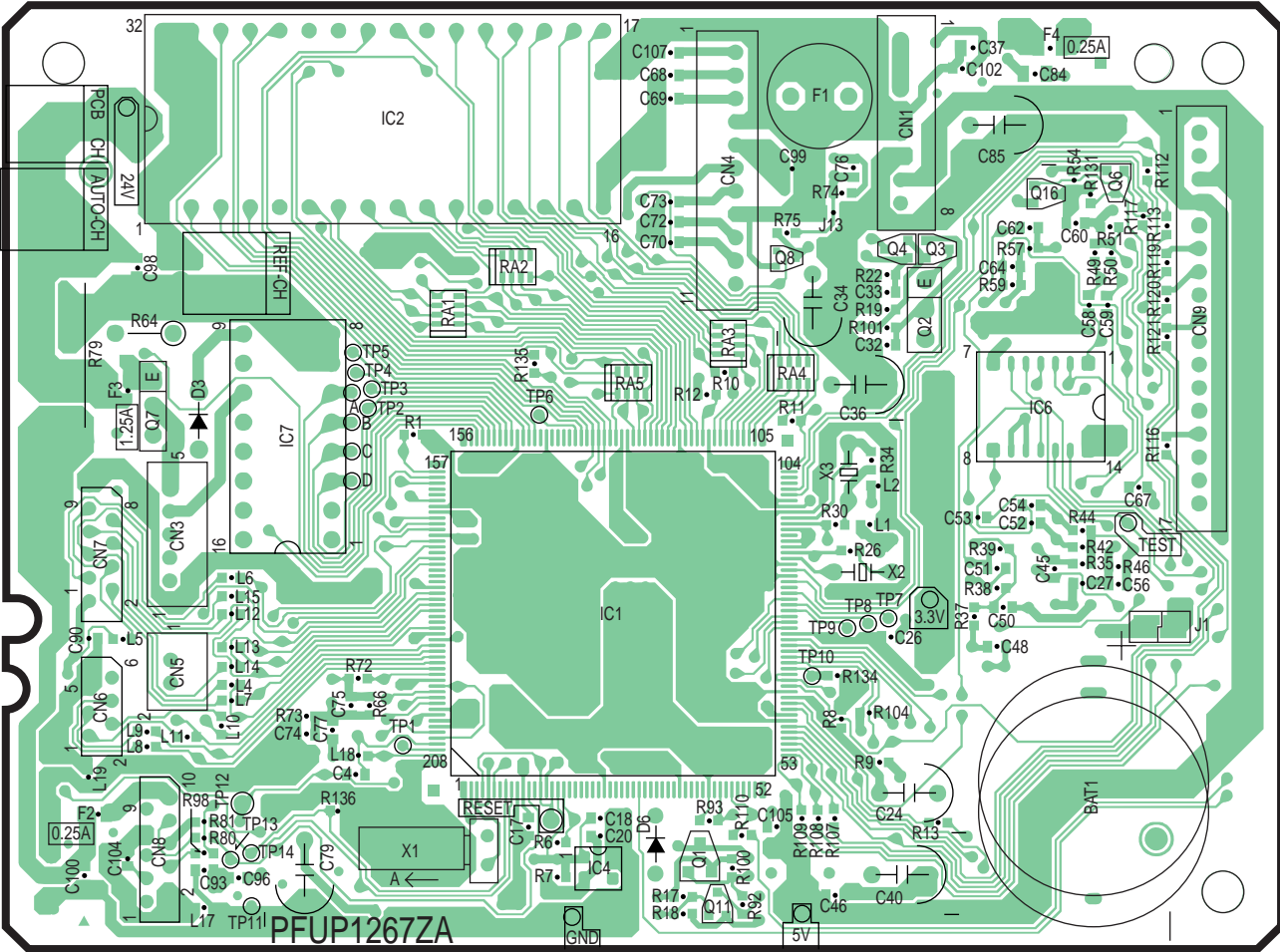




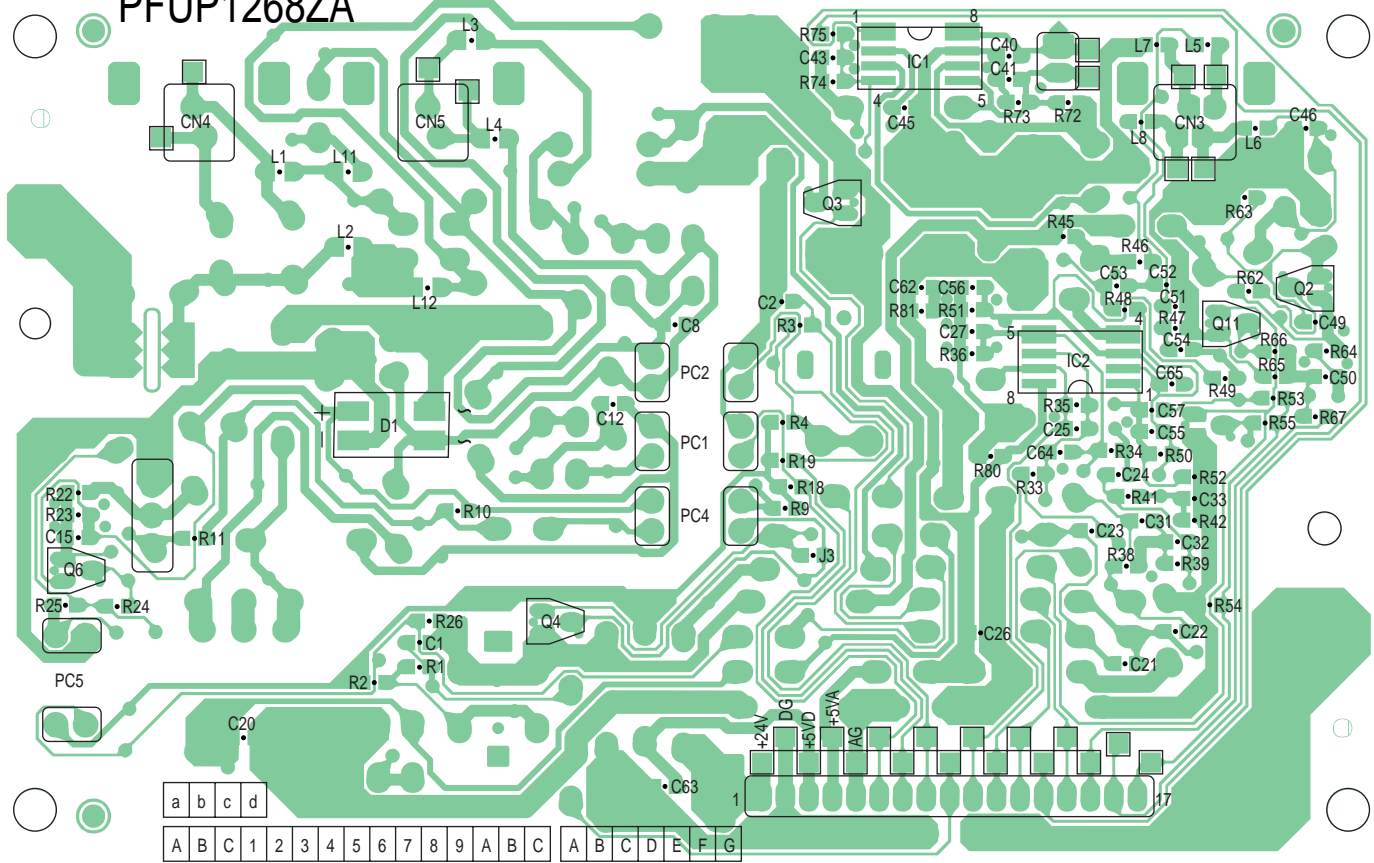




DIGITAL BOARD (COMPONENT)
KX-FT72SA-W



PFUP1268ZA



a	b	c	d
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A	B	C	1	2	3	4	5	6	7	8	9	A	B	C	A	B	C	D	E	F	G
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ANALOG BOARD (COMPONENT)
KX-FT72SA-W